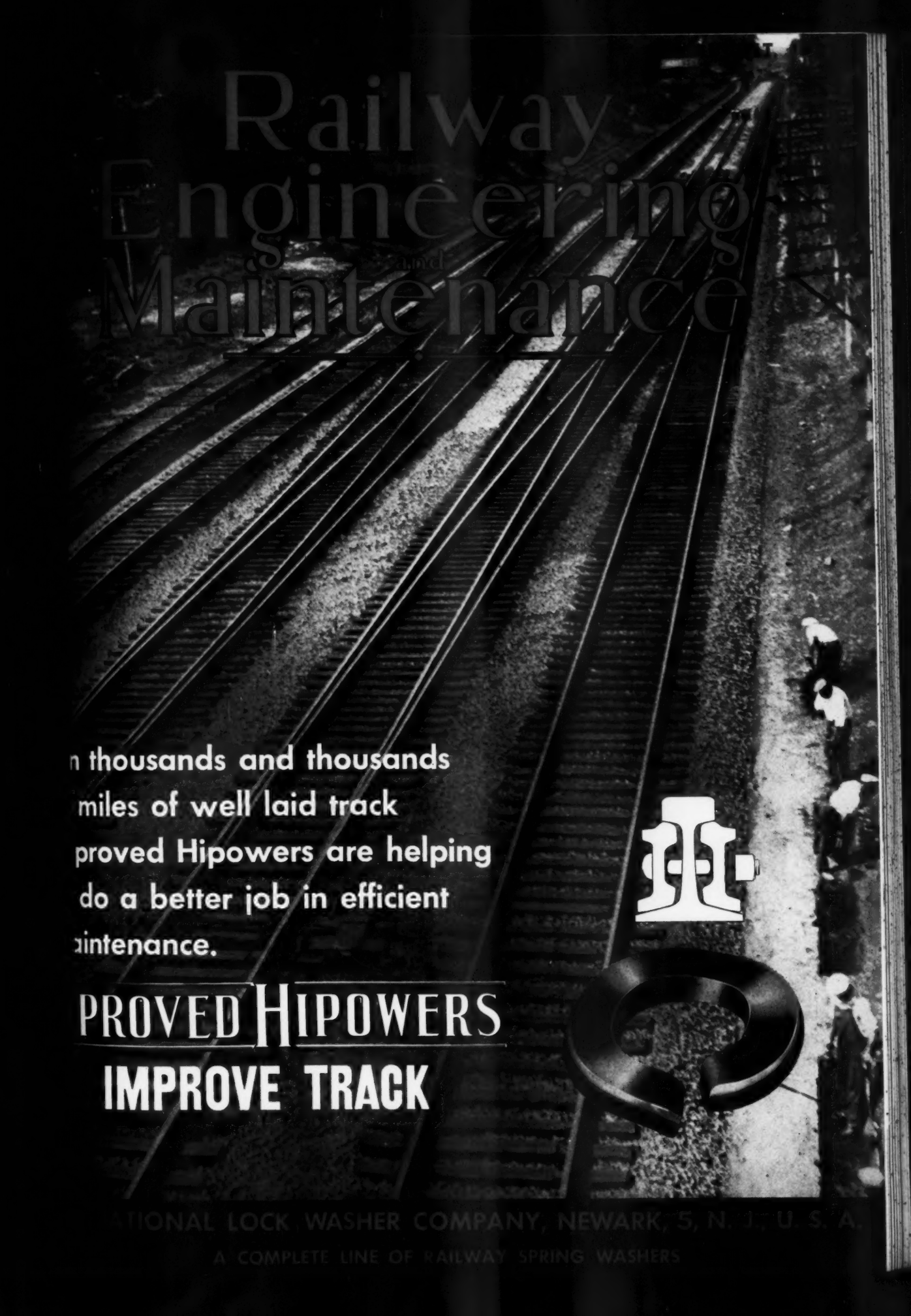
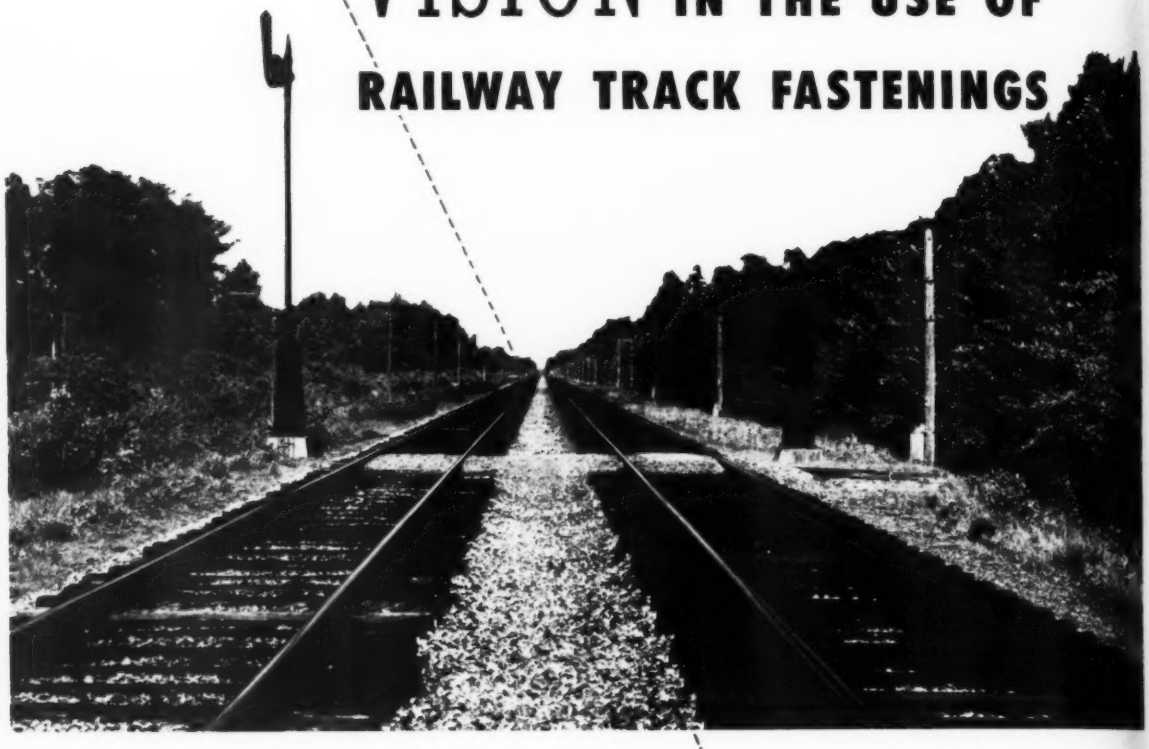


n thousands and thousands
miles of well laid track
proved Hipowers are helping
do a better job in efficient
aintenance.

PROVED HIPOWERS
IMPROVE TRACK

TIONAL LOCK WASHER COMPANY, NEWARK, 5, N. J., U. S. A.
A COMPLETE LINE OF RAILWAY SPRING WASHERS

VISION IN THE USE OF RAILWAY TRACK FASTENINGS



INCLUDES RELIANCE HY-PRESSURE HY-CROME *Spring Washers*

Our eyes tell us the tracks meet at the horizon. Engineering knowledge tells us otherwise. Engineering vision goes beyond appearance to provide efficiency, economy, safety.

Engineering vision is an important factor in Spring Washers, too. Combined with experience, manufacturing ingenuity and careful control of raw material, it puts quality and satisfaction into them. They accomplish the very definite purpose of better maintaining track joints. They keep track bolts *tighter longer* and under constant tension. They also act as hardened thrust bearings, permitting a better tightening job.

The use of vision in the selection of track washers definitely points to Reliance Hy-Pressure Hy-Crome Spring Washers. There is a spring washer in the Hy-Crome family to successfully cope with every track fastening problem. May we suggest that you call upon the Eaton Reliance railroad representative to help you with your engineering and purchasing problems.

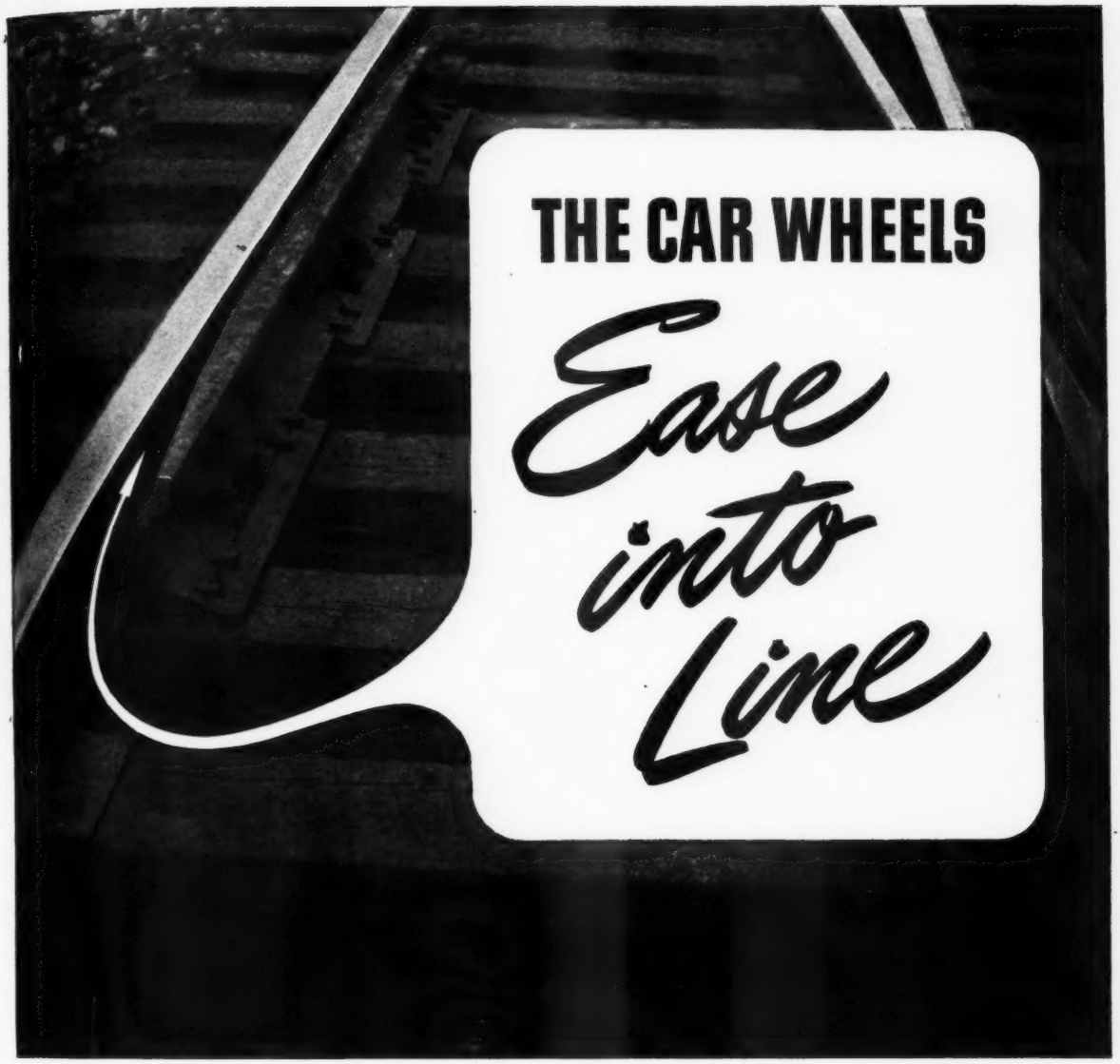
Edgemark of Quality

EATON
EATON MANUFACTURING COMPANY

Reliance **HY-PRESSURE HY-CROME** *spring washers*

RELIANCE DIVISION
Offices and plant: MASSILLON, OHIO

Sales Offices: New York • Cleveland • Detroit • Chicago • St Louis • San Francisco • Montreal



When wheel flanges rush past Bethlehem's Hook-Flange Guard Rail, there isn't the jolting, jarring shock that can sometimes result in chipped or cracked metal. Wheels really *ease* into line—and the answer is the resilient end construction of this widely-used guard rail.

Notice the flare, as shown in the photograph. It "cushions"—guides the wheels in gently, even at main-line speeds. It also saves wear and tear on the guard rail. We've been making these rails for years, and we've never yet heard of one breaking under traffic.

Another good feature: the "hook" flange extends under the base of the running rail, so that the weight of the train helps keep the guard rail from overturning, regardless of side thrust. Lateral movement is prevented by a shoulder on each of the special tie plates.

We'd like to tell you more about this unique guard rail—how easily it's installed, how it saves frog points, etc. At your request, a Bethlehem representative will be glad to furnish all details.

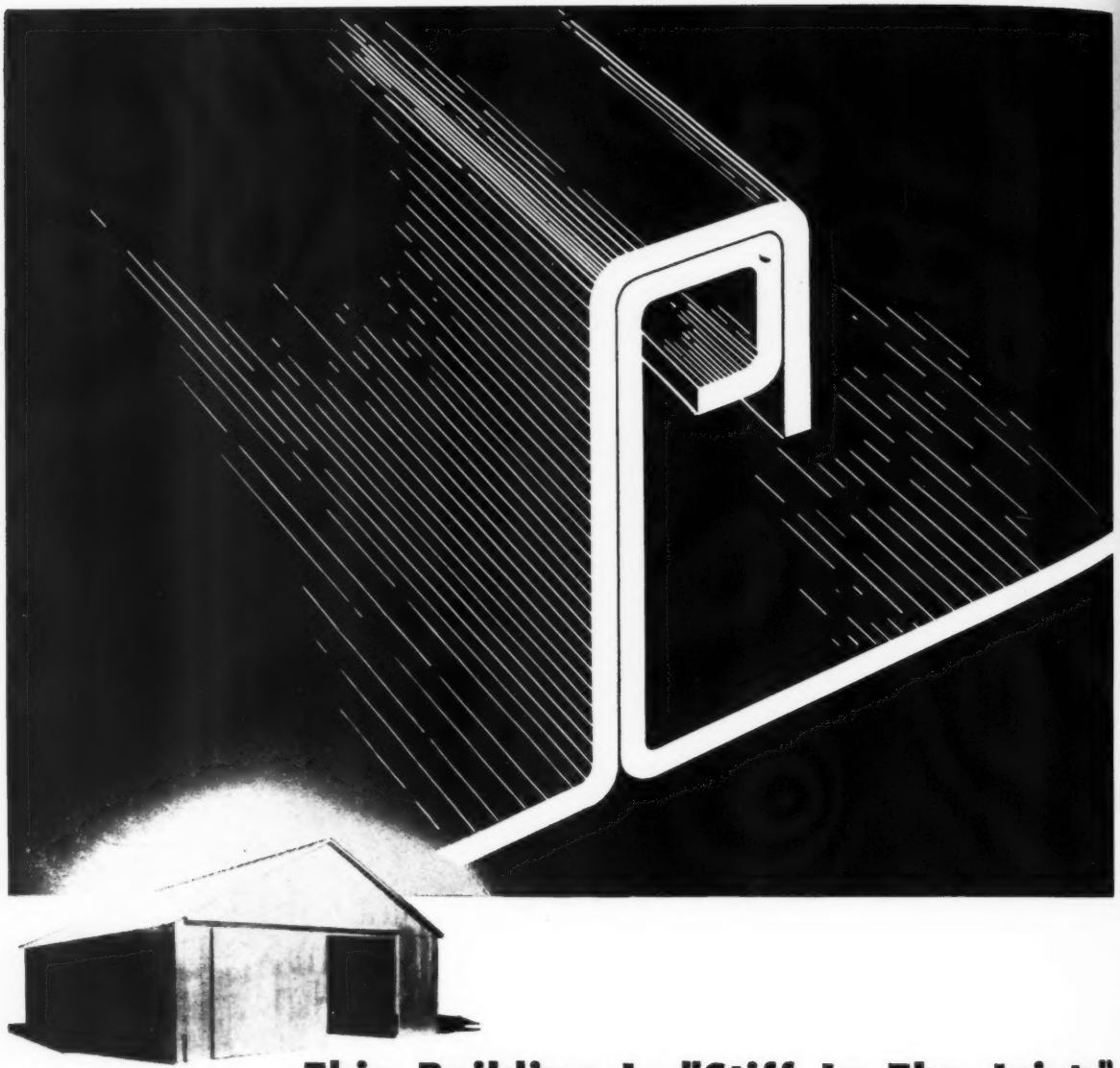
Bethlehem Steel Company, Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM HOOK-FLANGE GUARD RAIL

BETHLEHEM STEEL

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.



This Building Is "Stiff In The Joints"

It is not a sign of old age because the Armco-developed STEELOX joint keeps these standard buildings trim and youthful.

With the revolutionary STEELOX method, the jointed panels provide both structural support and finished surface. For sidewalls they save framing and outside covering. On the roof, STEELOX panels replace rafters, sheathing and roofing. Assembly is simplified, appearance improved and weathertight construction assured. The patented joint withstands expansion, contraction and unequal settlement. It remains weathertight even under severe conditions. Unskilled workmen quickly join the panels into a sturdy, handsome structure.

There are other advantages in using Standard STEELOX Buildings. The sturdy panels are formed of ARMCO Galvanized PAINTGRIP Steel and can be painted immediately or left unpainted. No treatment is necessary. All-steel construction is an excellent fire-barrier. STEELOX Buildings have the long life and low upkeep of a permanent structure, yet when necessary can be quickly dismantled and re-erected at another location. All parts are uniformly strong yet light in weight for easy handling.

STEELOX Buildings are prefabricated in a wide range of standard sizes to fit your requirements. Write for prices and complete information. Armco Drainage & Metal Products, Inc., 845 Curtis Street, Middletown, Ohio. Offices in principal cities.

ARMCO STEELOX BUILDINGS

ARMCO

NEW YORK CENTRAL SYSTEM

Another NORTHWEST for the NEW YORK CENTRAL!

The New York Central System has been a Northwest user for many years. They have owned Northwest Shovel, Crane and Dragline equipment on all classes of work.

Ten machines, nine repeat orders, make a testimonial to satisfactory service that can't be equalled. This famous railroad is only one of the many Class I railways in the United States and Canada that is a repeat order buyer of Northwests.

REPEAT ORDERS RESULT FROM SUCCESSFUL SERVICE

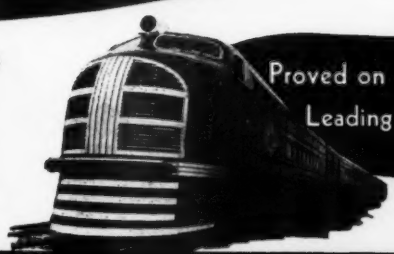
•

10 NORTHWESTS FOR THE NEW YORK CENTRAL SYSTEM

NORTHWEST ENGINEERING CO.
1513 Field Building, 135 South LaSalle Street
Chicago 3, Illinois

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL



Proved on the Nation's Leading Railways

A powerful magnet and smooth operation provide fast handling with complete safety.

With slings the crane can raise and carry huge loads of rails, boiler tubes, pipe, sheets and any other bulky material. Note the clamshell bucket, available for moving ballast, cinders, coal and similar materials.

The LS-90 magnet crane is "built to order" for rapid handling of small parts such as tie plates and miscellaneous scrap.

They Handle Anything

WITH THEIR

LINK-BELT SPEEDER

"OFF-THE-TRACK" LS-90 CRAWLER CRANE GOES ANYWHERE—ANYTIME—*DOES MANY JOBS!*

In the Pueblo yard of the D. & R. G. this Link-Belt Speeder LS-90 Crane literally goes anywhere. Being crawler mounted it needs no track and never interferes with other equipment which must use the rails.

With sling, magnet or clamshell bucket it will hoist, stack, load, unload and transport anything from sand up to structural steel, sheets, rails and pipe.

Superintendent, foreman and chief engineer are in agreement that this Link-Belt Speeder is doing a swell job, with greater convenience and at a saving of much time, compared to former methods.

10,782

Link-Belt Speeder shovel-cranes, from 3/8 yard to 3 yard capacity, crawler or wheel mounted, offer a type and size to meet any requirement, for yard, stores, repair shop or line construction and maintenance. There is a distributor near you, ready and equipped to give you prompt, courteous sales and service.

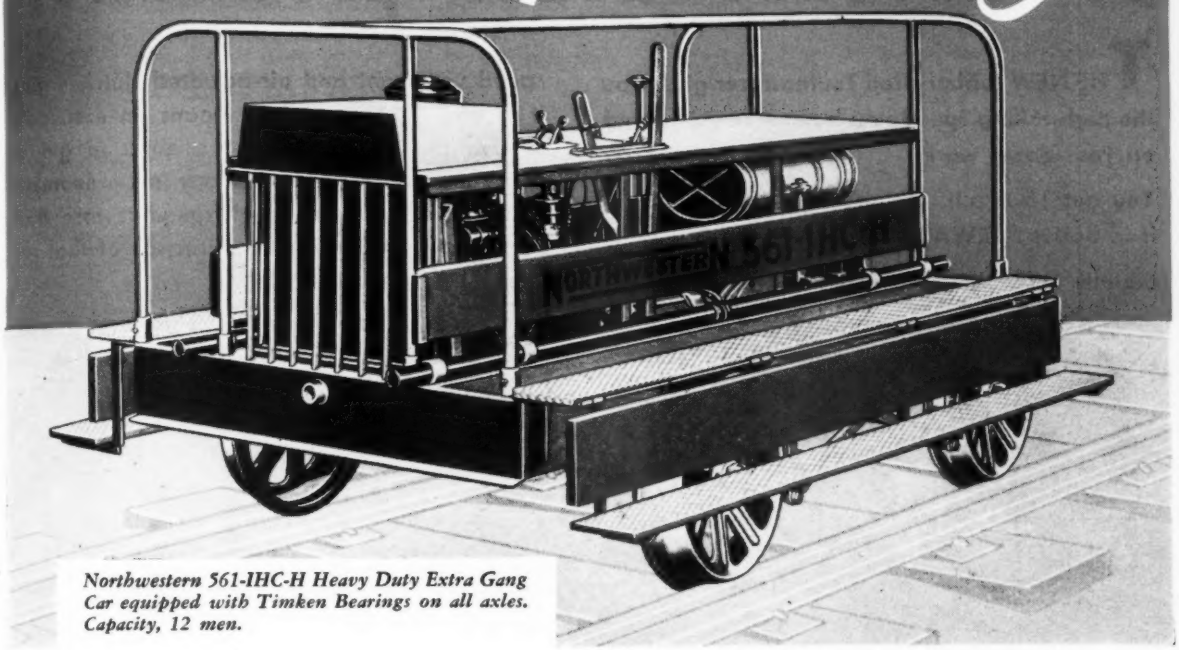
LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION
A DIVISION OF LINK-BELT COMPANY
CEDAR RAPIDS IOWA

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

For additional information, use postcard, pages 741-742

TRACK GANGS "*GO PLACES*" QUICKLY, DEPENDABLY ON *Timken Bearings*



Northwestern 561-IHC-H Heavy Duty Extra Gang Car equipped with Timken Bearings on all axles. Capacity, 12 men.

Manufacturers of modern railway motor cars know that no car can be better than its running gear. So to sturdy, deflection-free axles and strong, shock-resistant wheels they add the frictionless smoothness; the radial, thrust and combined load capacity; the stability and alignment preservation of Timken Tapered Roller Bearings.

But they get even more, for in addition to these advantages, Timken Bearings prevent axle wear; maintain accurate wheel gauge under all conditions of load and speed; require little attention for lubrication.

Like big main line locomotives and cars, Timken Bearing Equipped section motor cars present greater availability for service because they need less time out for maintenance and repair.

Make "Timken Bearing Equipped" a strict requirement on your next car order. It pays.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

TOURNADOZER

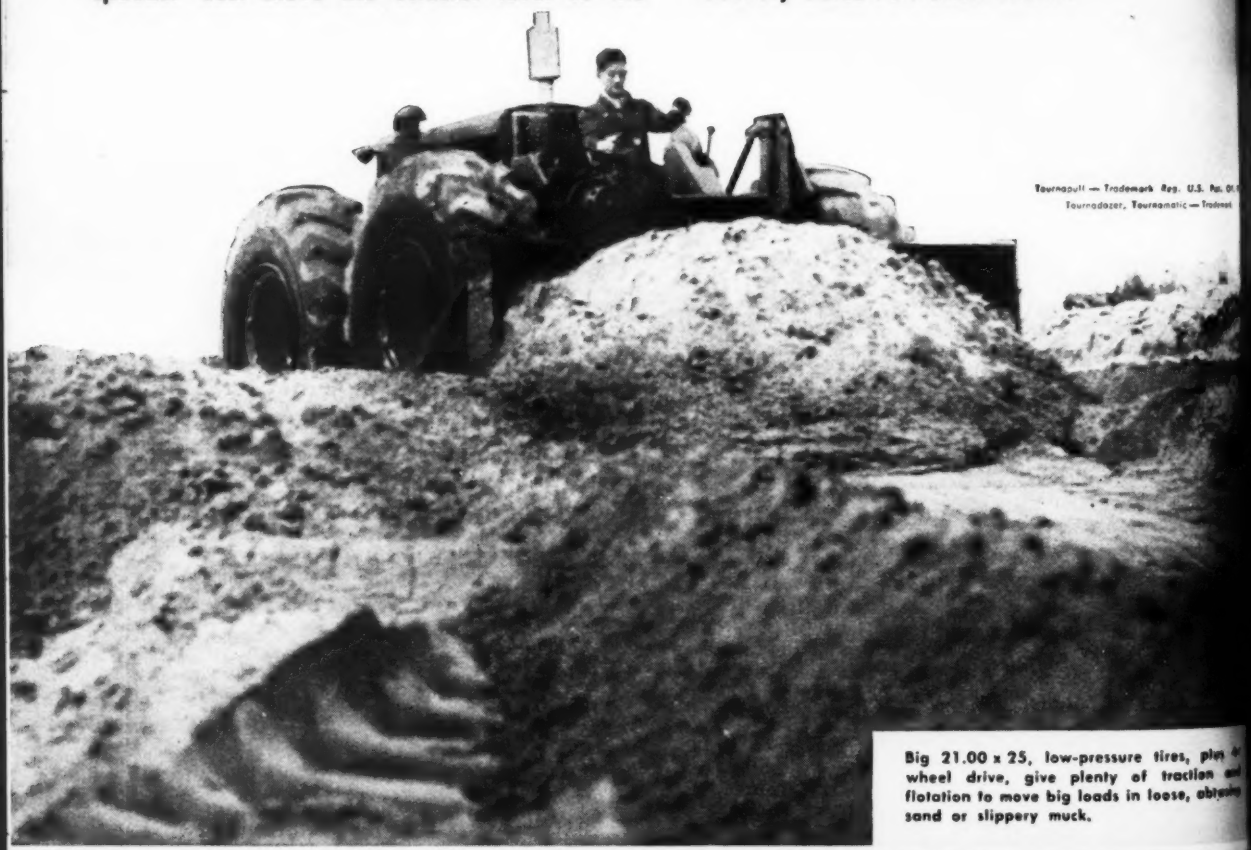
New high-speed, rubber-tired tool to increase dozer production

THE NEW rubber-tired Tournadozer gives you the high-rolling speed you have always wanted on your dozer work.

You get 15 m.p.h. top speed . . . and you get it in BOTH FORWARD and REVERSE.

Equally important is the constant-mesh Tournamatic transmission which gives you instantaneous selection of 4 forward and 4 reverse speeds. Just move the selector lever to the speed you want and air-actuated clutches give it to you right now. This means an extremely fast, maneuverable unit . . . quick to get in there and get going without any loss of momentum . . . and you get high-speed reverse that cuts "deadhead" time to a fraction of that required by track-type tractors.

180 h.p. Model C Tournadozers are now in production . . . other sizes follow soon. See us for delivery dates . . . order NOW.



Tournapull — Trademark Reg. U.S. Pat. Off.
Tournadozer, Tournamatic — Trademark

Big 21.00 x 25, low-pressure tires, plus 4-wheel drive, give plenty of traction and flotation to move big loads in loose, obstructing sand or slippery muck.

LE TOURNEAU

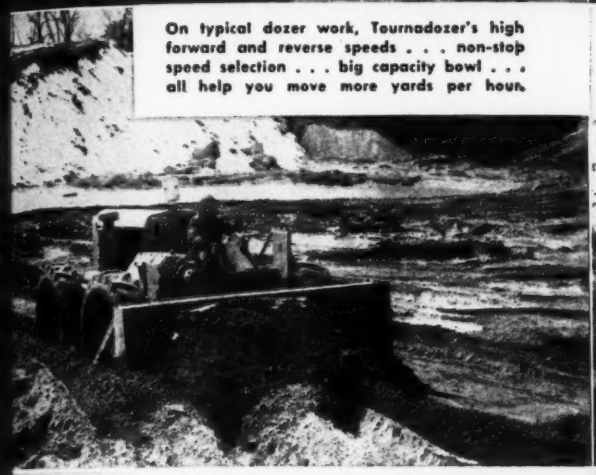
LET

See your Le Tourneau Distributor NOW for complete information

On steep banks, fast-acting cable control gives instant blade response . . . 8' wide gauge, plus short-coupled wheelbase, gives greater stability, sure-footed traction.

Big load capacity, ground-gripping traction and high-speed maneuverability on or off pavement increase the utility of the Tournadozer as an all around production tool.

On typical dozer work, Tournadozer's high forward and reverse speeds . . . non-stop speed selection . . . big capacity bowl . . . all help you move more yards per hour.



Removing scrub brush, small trees, stripping, leveling are some of the jobs where the speed and mobility of the rubber-tired Tournadozer can give you increased production

Operator up front, has unobstructed vision. No neck stretching and twisting. Handy, easy controls. Hydraulic-suspension seat is soft, comfortable. No end-of-shift "slowdown"

Tournadozer rolls on rubber at 15 m.p.h., job-to-job over pavement. Makes fast, on-the-job moves . . . stockpiles, feeds hoppers, maintains roads, backfills.

The new Tournadozer is designed and built to push as well as doze. Push of load increases traction on all four wheels. Quick, alert, agile . . . for fast scraper loading.

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

TOURNADOZERS

18 years without maintenance

This Stores Building shows little, if any, effect from its 18 years of exposure.

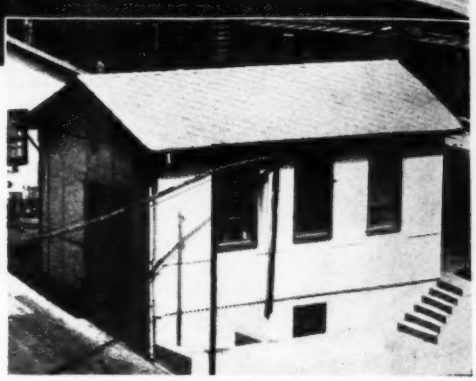
Because these buildings were "built to last" with J-M CORRUGATED TRANSITE*

The Corrugated Transite Sheets that form the walls of these three railroad buildings are today structurally sound, fire-resistant, and weatherproof. Yet, in 18 years, no maintenance has been required to keep them that way . . . because Transite needs no paint or preservatives to resist weather and corrosion.

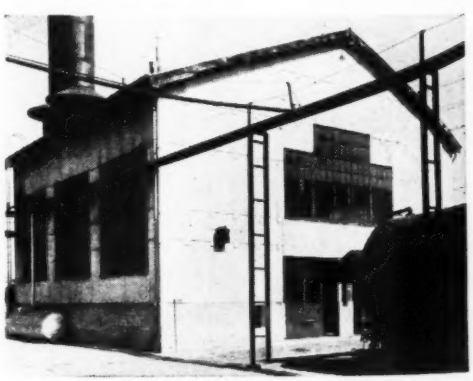
Transite is made of asbestos and cement, formed under tremendous pressure into sheets of great strength and durability. Yet it may be sawed and drilled, fastened with bolts, nails or screws. The large sheets, corrugated for extra strength, save framing material, simplify and speed construction.

Stone gray in color, Transite lends itself to the design of modern structures . . . may be used alone or in combination with other building materials. For further information, write for illustrated brochure TR-45A. Address, Johns-Manville, Box 290, New York 16, N. Y.

Reg. U.S. Pat. Off.



Corrugated Transite Sheets were used here in combination with J-M No. 70 Hexagonal Asbestos Shingles for the roof—a long-lived J-M team.



This boiler house provides another example of the adaptability of Corrugated Transite to railroad buildings of practically any size and type.

Johns-Manville

89 YEARS OF SERVICE TO TRANSPORTATION

How RED LEAD "PASSIVATES" METAL ...inhibits RUSTING

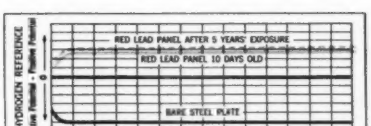
Research discloses sound reasons for Red Lead's long acceptance as the "standard" metal protective paint.

None is more important than Red Lead's ability to keep iron and steel in a "passive" state, in which the rusting process is held to a minimum.

As you know, unpainted steel, exposed to moisture, rapidly rusts. However, the same metal, under identical exposure conditions, remains "passivated," or rust-inhibited, when coated with Red Lead.

Proof of this is given in the graph at the right. It shows clearly the rust-inhibitive effect of Red Lead paint on steel, as contrasted with the rapid and continuous rusting of unpainted metal.

It is worth noting that, even after five years' exposure, the "passivating" power of Red Lead is still retained. Small wonder, then, that maintenance men think of Red Lead *first* when it comes to making metals *last*.


HYDROGEN REFERENCE
Negative Potential ← 0 → Positive Potential
RED LEAD PANEL AFTER 5 YEARS' EXPOSURE
RED LEAD PANEL 10 DAYS OLD
BARE STEEL PLATE
10 20 30 40 50 60 70 80 90 100 110 120 130 140
TIME IN HOURS UNDER POTENTIAL MEASUREMENT TEST

Graphic Evidence of RED LEAD'S Protective Power

The non-corroding state of Red-leaded steel, as compared with unprotected steel, was measured electrically. A piece of unpainted steel was immersed in water. The iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential relative to hydrogen (see above graph).

However, when steel panels painted with Red Lead were immersed under the same conditions, iron and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

* * *

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including many of the fast-drying resin types.

Specify RED LEAD for ALL Metal Protective Paints

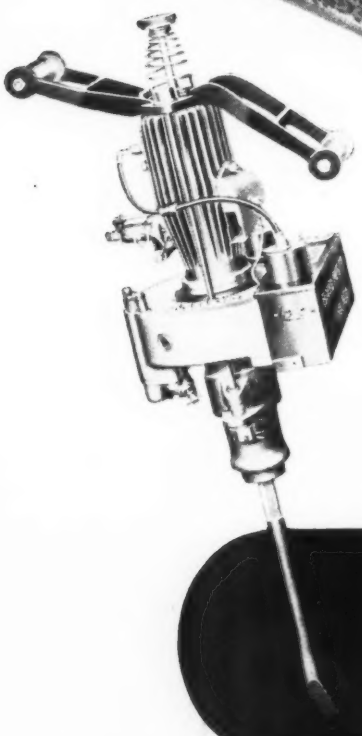
The rust-resistant properties of Red Lead are so pronounced that it improves any metal protective paint. So, no matter what price you pay, you'll get a better paint if it contains Red Lead.

* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.); Philadelphia 7 (John T. Lewis & Bros. Co.); Pittsburgh 30 (National Lead Co. of Pa.); Charleston 25, W. Va., (Evans Lead Division).

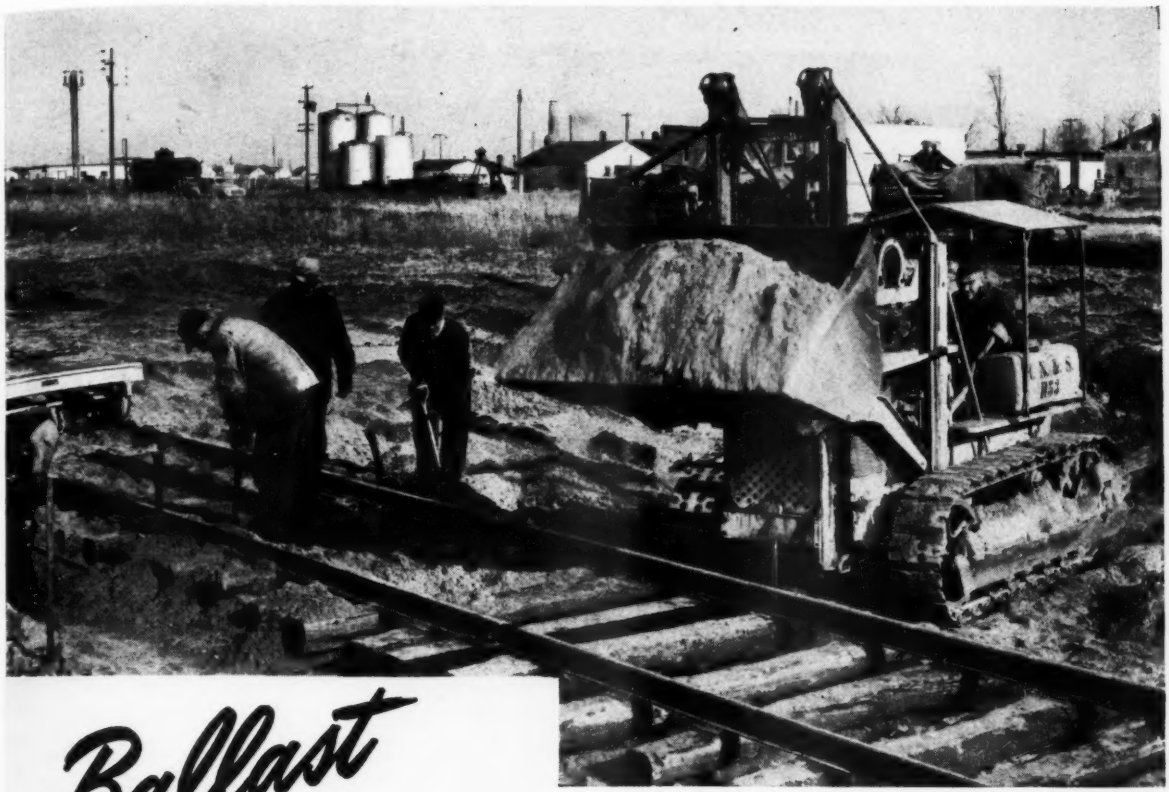
DUTCH BOY
Reg. U.S. Pat. Off.
RED LEAD



The greater the speed and the heavier the traffic, the better the tamping has to be. Barco Unit Tytampers have been tested the certain, positive way—by a record of success lasting not merely a few years, but ten years—not on hundreds of jobs, but on thousands. These self-contained powerful tools have just the right weight to deliver full impact without requiring extra pressure from the operator. Put Barco on the job for more uniform and permanent tamping. For more information write to Barco Manufacturing Company, Not Inc., 1805 Winnemac Avenue, Chicago 40, Illinois.

BARCO UNIT TYTAMPERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY



• *"Caterpillar" Diesel D4 Tractor with Trackson Traxcavator filling roadbed for spur to industrial site at Richfield, Minn. Works 8 hours a day; consumes 1¼ gallons of 8½c fuel per hour. Owned by Minneapolis, Northfield and Southern Railway.*

Ballast by the Big Bucketful

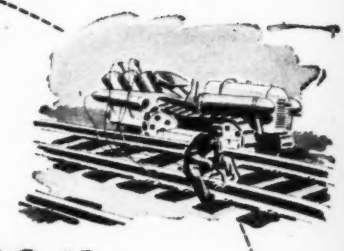
Laying spurs and sidings moves fast with the "hod-carrying" combination of "Caterpillar" Diesel Tractor and Trackson Traxcavator. This outfit digs, hauls, dumps—can gather ballast right along the right-of-way; keep a gang of men busy raising, tamping, tidying up.

Compactness enables this handy unit to work in close quarters, climb over obstacles—"root and tote" wherever it can find material. Useful, too, in ditching and cleaning cuts.

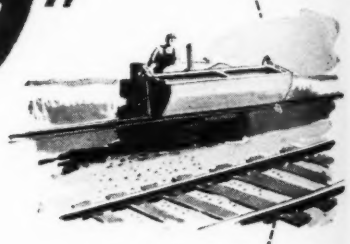
In the winter the same outfit can keep its feet and hands warm moving snow; and when not otherwise engaged it can do yard clean-up, rubbish removing, excavating, car loading from stock-pile, etc. Indeed, here is one of the handiest pieces of equipment that ever answered an M.W. superintendent's prayer. . . . And an investment that should liquidate itself almost before you can say amortization!

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR
DIESEL
ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT



"MAINTENANCE handyman"



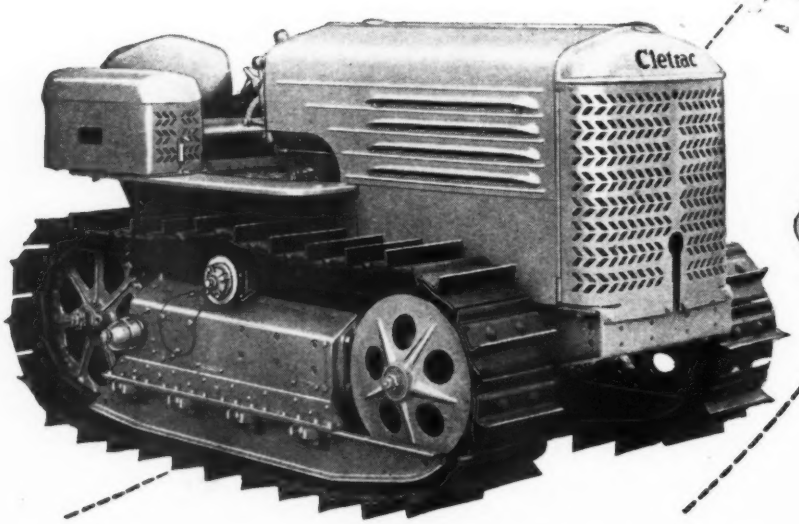
There's virtually no limit to the number of useful tasks an Oliver "Cletrac" crawler tractor can do to stretch your maintenance dollar. Equipped with welder, bulldozer, Drott Bull Clam, compressor, snow plow or other auxiliary equipment, this "handy-man" works off track . . . does not impede traffic. It eliminates the need for long pipe lines or cables in maintenance work.

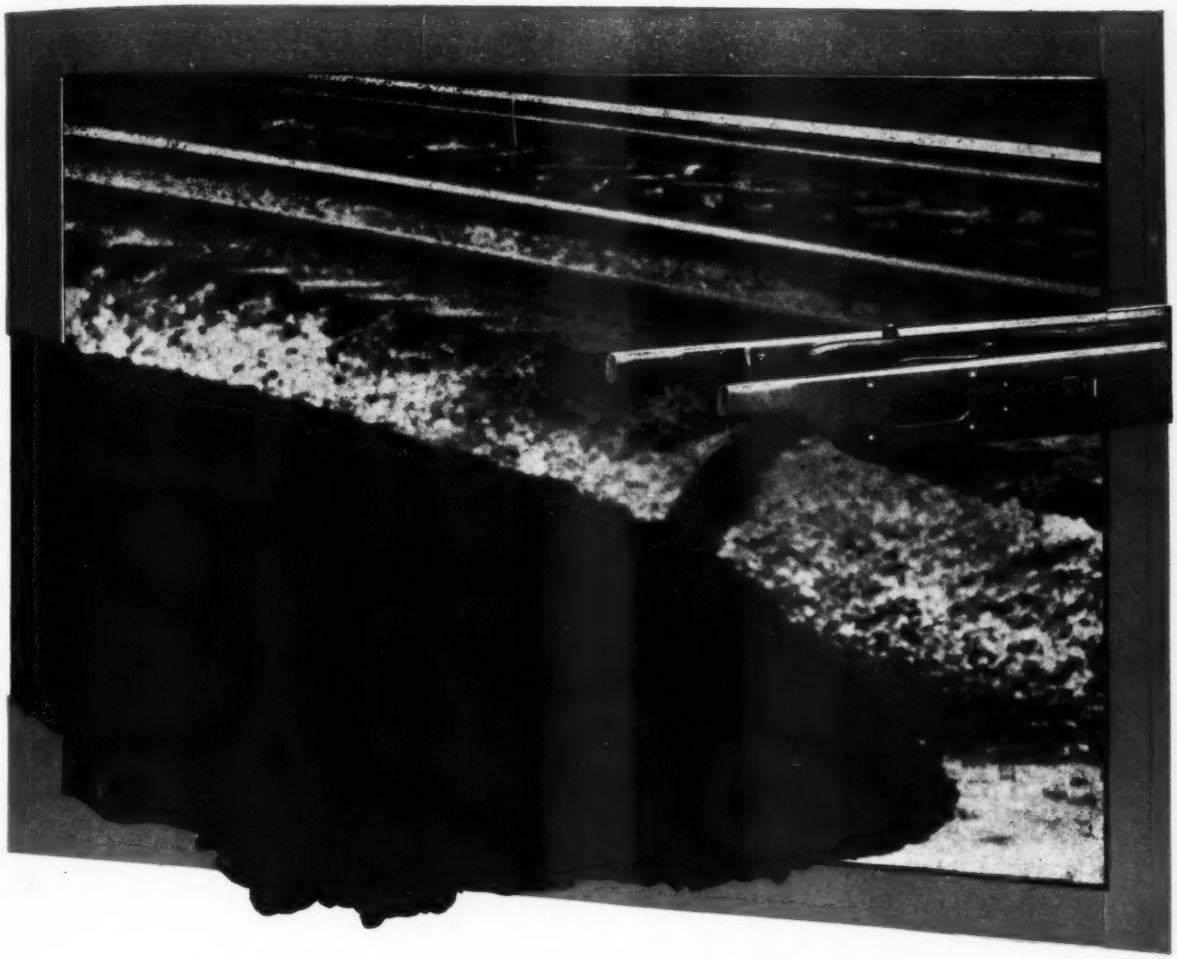
With a Cletrac on your maintenance crew, there's no need for an expensive work train on most jobs . . . no special power units or specialized machinery. The Cletrac with its auxiliary equipment can perform the majority of the work needed along the right-of-way faster . . . more economically.

For all the facts, write The Oliver Corporation, Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio.

Cletrac

a product of The OLIVER Corporation





MOUNTAINS (OF DIRT) FROM A "MOLE"

The mountain range above is only two feet high but it represents the peak of roadbed maintenance efficiency. Just a flick of the switch starts the new model McWilliams "Mole" Ballast Cleaner through the ballast of your road, sifting out unwanted cinders and dirt as it moves forward 3 feet per minute.

Manufacturers of The McWilliams "Mole" and RMC Rail Joint Packing

RAILWAY MAINTENANCE CORP.

PITTSBURGH 30, PENNSYLVANIA

EFFICIENT TAMPING

with CP-5 Gasoline Tie Tamper

- Starts quickly and easily – by merely pressing on one of the grip handles.
- Has perfect balance – since weight is centered between grip handles.
- View of work is unobstructed – because of compact engine design and slender contour of lower end of tool.
- Air-cushioning of return stroke of free-throw striking piston minimizes vibration in grip handles and prolongs machine life.
- Magneto provides efficient ignition system under all conditions – there are no batteries, thus eliminating costly battery replacements.
- Standard two-cycle engine operates on gasoline-oil fuel mixture – oil in fuel provides automatic lubrication.
- Write for Bulletin 1943 – Maintenance-of-Way Equipment.

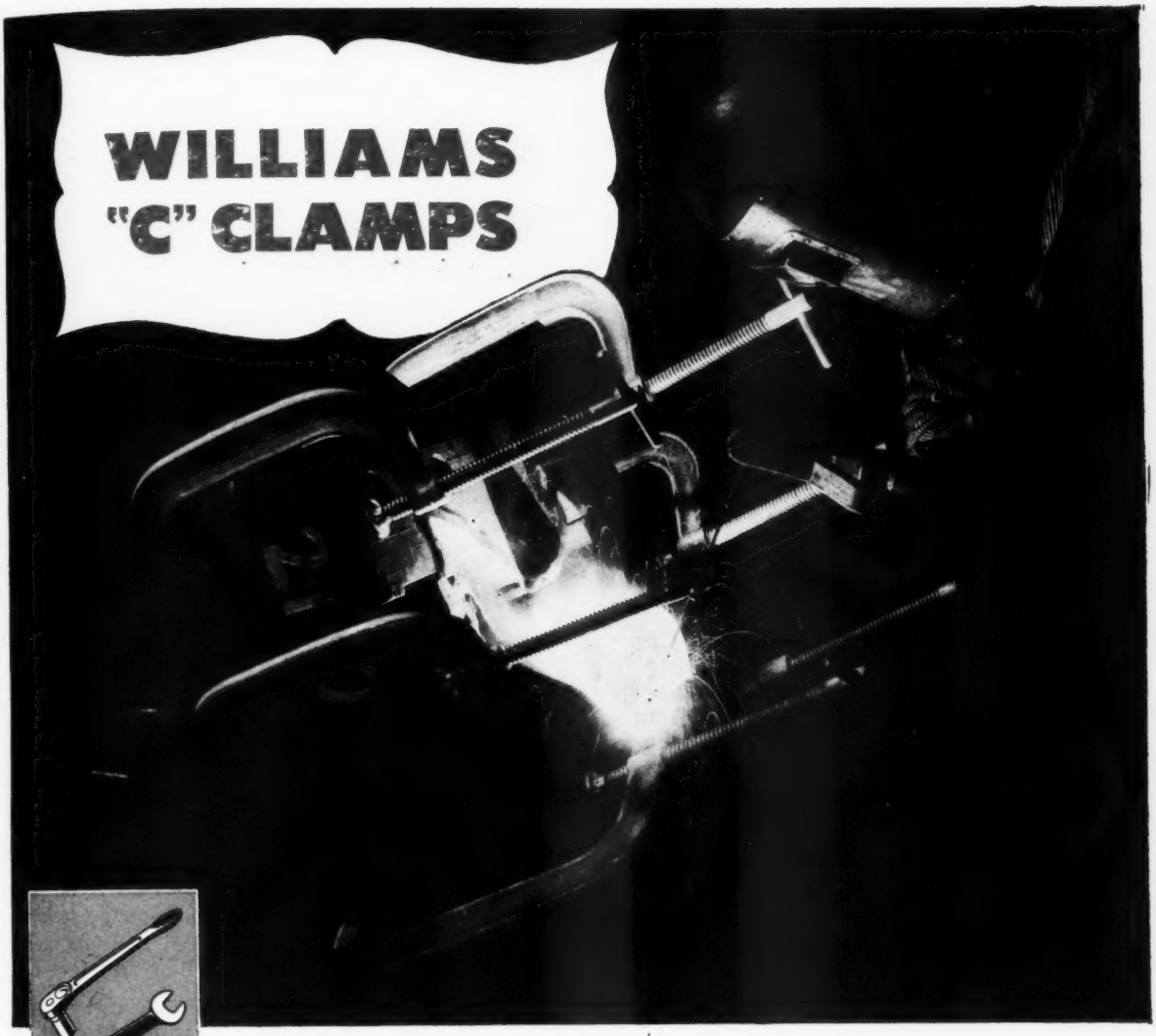
CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

For additional information, use postcard, pages 741-742

WILLIAMS "C" CLAMPS



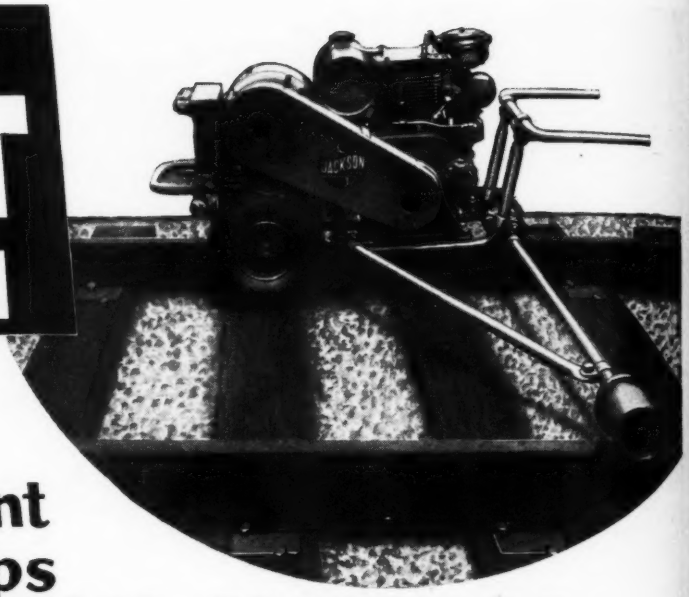
for Positive Holding Power

For those countless *holding* jobs daily encountered in shop or plant, you can't beat the slip-proof grip of Williams "C" Clamps. They are *drop-forged* from tough, selected steel—specially heat-treated to further increase their strength and reduce any liability of springing.

Williams Clamps are available in a variety of patterns and sizes for light, general and heavy duty. The clamps illustrated have a special spatter-resisting finish for welding service. All screws are hardened, tempered and threaded U.S. Standard. Sold by Industrial Distributors everywhere. J.H. Williams & Co., Buffalo 7, N.Y.

WILLIAMS
DROP-FORGINGS AND DROP-FORGED TOOLS

for SPOT Tamping buy



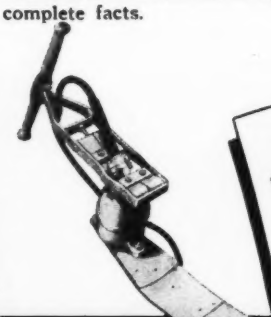
The Equipment that's Also Tops for ALL GENERAL SURFACING and NEW BALLAST INSERTIONS!

For the small section gang standard Jackson Tampers and Power Plants are ideal for Spotting and such other out-of-face work as gangs of this type do on many roads.

For any major job of ballast placement the same standard Jackson Tampers and Power Plants used as section equipment can be grouped for highly efficient large gang operation.

TAKE a look at the M-2 Outrigger-mounted JACKSON POWER Plant. It's a highly mobile unit — designed to operate two or four of the famous JACKSON Vibratory Tie Tampers — light enough for two men to remove from the track in a matter of moments, and equipped with a permanent magnet generator that requires no adjustment or maintenance. It's by far the most reliable Portable Power Plant ever built. Give your section gangs the combination of this Power Plant and Jackson Tampers and watch their production soar!

But that's only half the story. Though many railroads prefer section and extra gangs to have their own Jackson Tampers, when a general lift is necessary or new rail laid your section equipment may be grouped in extra gang service for the most efficient ballast placing combination obtainable; and when the job is done, again returned to the sections for maintenance work. That's mighty worthwhile versatility. And remember that whether it's spot tamping or a major ballast placing job, JACKSON Tampers will do more and better work with less upkeep expense than any other equipment — the basic reason why they are extensively used by more than 4 out of 5 of the leading roads throughout the nation. Furthermore, when used on both classes of work, the mechanical maintenance of equipment is uniform. Let us give you the complete facts.



JACKSON Tie Tampers and POWER PLANTS

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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August, 1947

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RAILWAY ENGINEERING & MAINTENANCE

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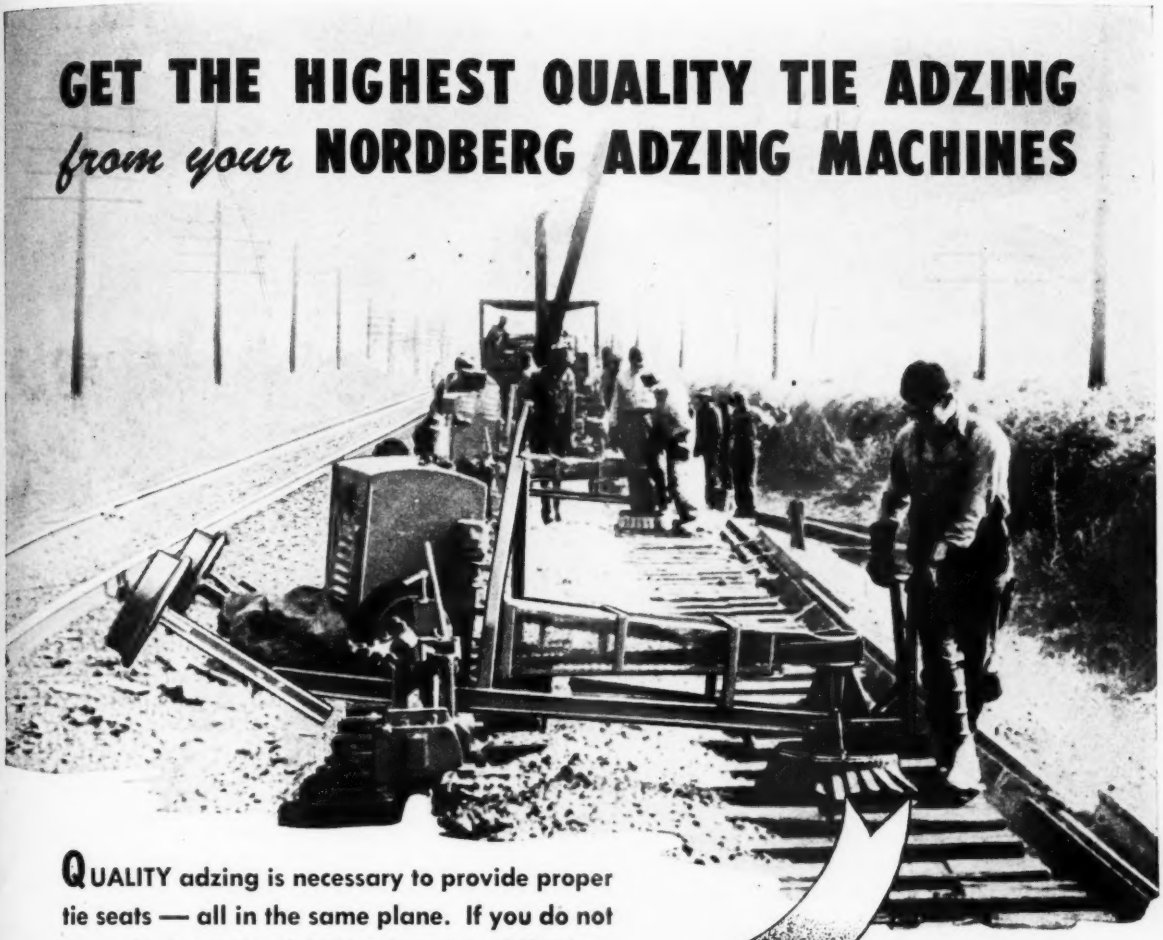
READER SERVICE DEPT.

GET THE HIGHEST QUALITY TIE ADZING *from your* NORDBERG ADZING MACHINES



QUALITY adzing is necessary to provide proper tie seats — all in the same plane. If you do not have the latest Model BZ Adzer, it is difficult to secure the most desirable results. The Model BZ has improvements for making quick and accurate adjustments to meet varying rail heights and special canted tie seats. Early models still in use can be profitably retired from the standpoint of accuracy and time saving which the present day model assures.

If you are not getting the most from your Nordberg Adzers, write us or discuss it with our representative in your territory.

NORDBERG MFG. CO.
MILWAUKEE 7, WIS.

- Cutter head quickly adjusted to varying rail heights.
- Simple adjustments for correct adzing of canted rail.
- Improved guide rollers for passing through crossings.
- Balanced hitching point for lifting off track with crane.

NORDBERG TRACK MAINTENANCE MACHINES

ADZING MACHINE • SPIKE PULLER • TRACK WRENCH • SPIKE HAMMER
RAIL DRILL • POWER JACK • CRIBEX • RAIL GRINDER • TRACK SHIFTER

TWO NEW
WOOLERY MACHINES
for better maintenance at lower cost

THE MODEL "N" TIE CUTTER, incorporating the basic features of the Woolery Tie Cutter, at a substantial reduction in price.

The Woolery Tie Cutter eliminates the slow, laborious, back-breaking, expensive features of tie replacement by old methods. No trenching or jacking up of track; ballast disturbance is kept at a minimum. Advanced engineering has produced a light weight, sturdy machine to make the work of tie replacing quicker, easier, better, and at a substantial saving in tie replacement costs.

A reciprocating cutting blade is a fundamental feature. Average time for a cut is 25 seconds. After tie is cut in three pieces, ends are easily pried out with a bar—using center section as a heel. Center section is then lifted from between rails and new tie seated on a firm permanent base requiring little or no tamping.

MODEL PB WEED BURNER—May be mounted on a push car to be hauled by a track motor car for on-track use, or on a 1½-ton truck or two-wheel trailer for off-track service, and when not in service is easily removed and stored, releasing truck or push car for other work. Burns a 15-foot swath; with outside arms spread, burns to 25 feet by making second trip. Requires only two men to operate. Adjustable burner arms and individual flame controls. Adaptable as a snow melter.

WOOLERY MAINTENANCE MACHINERY

Weed Burners — Tie Cutters — Creosote Sprayers

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS • MOTOR CARS • TIE CUTTERS • TIE SCORING MACHINES • RAIL JOINT OILERS • CREOSOTE SPRAYERS • BOLT TIGHTENERS

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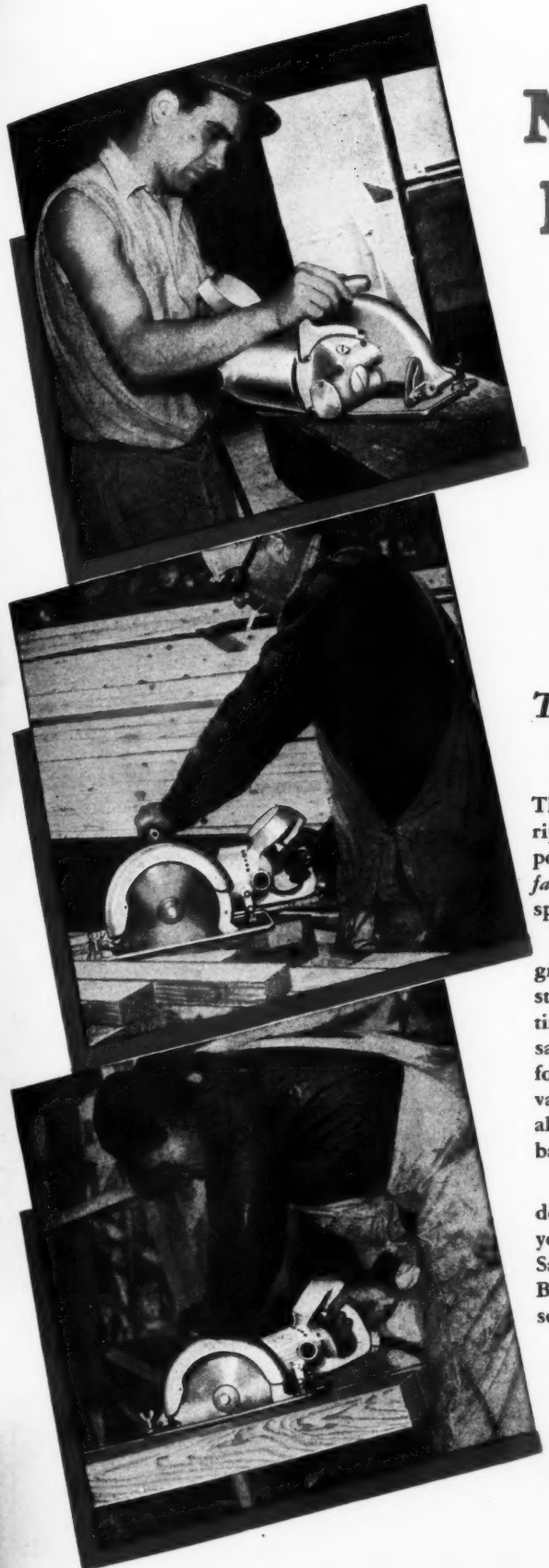
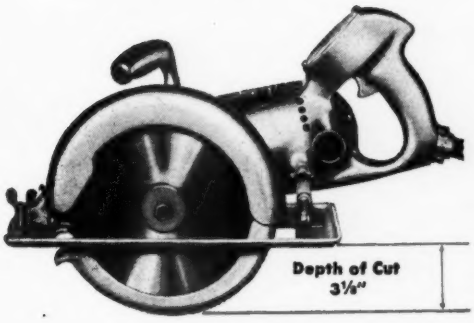


Makes Extra-Deep Cuts FASTER!



This Husky 9-inch "Quick Saw" is Powered for Heavy-Duty Sawing*

There's nothing like a Black & Decker 9" Quick-Saw for ripping hours off heavy construction sawing jobs! This powerful saw cuts to a maximum depth of 3⅛"—*ten times faster than hand sawing.* And it's built to take the rough spots without slowing up or overheating.

With a Quick-Saw, you can rip, crosscut, angle, groove, dado—on studs, roof trusses, rafters, joists, stair stringers, all kinds of heavy structural lumber—even save time by stacking boards for sawing. What's more, the same saw can be equipped with blades and abrasive discs for cutting compoboard, slate, tile, marble, asbestos, galvanized sheet, other thin or non-ferrous metals. Yet, with all its power and ruggedness, the Quick-Saw is perfectly balanced for easy handling.

Ask your nearby Black & Decker Distributor for full details on timesaving Quick-Saws. And write today for your free copies of our illustrated, informative "Electric Saw Handbook" and complete catalog. Address: The Black & Decker Mfg. Co., 663 Pennsylvania Ave., Towson 4, Maryland.

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PORTABLE ELECTRIC TOOLS

*Trade Mark Reg. U. S. Pat. Off.

COMPRESSION

Rail Anchors

THE economy of continuous pressure-welded rail through station platforms, in tunnels, bridges and open track has been convincingly demonstrated time and again. It is significant that in these exacting applications, ***two-way holding*** Compression Rail Anchors are almost invariably used.

THE RAILS COMPANY

General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

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Avoid PERMANENT WAVES

by Flame-Straightening Joint Bars

This efficient flame-straightening setup permits operation of two blowpipes by one operator.

Using standard heating blowpipes with extension tubes, two operators simultaneously flame-straighten both bars.

Permanent waves occur in track when rail ends are held below surface by bent and worn joint bars. In most cases deformed bars can be reclaimed in track by Oxweld's flame-straightening method. The center of the bar at the junction of web and base is quickly heated to a red heat. As it cools, contraction straightens the bar and allows the sagging rail ends to return to a more nearly true surface.

This economical process for flame-straightening joint bars results in: LONGER SERVICE LIFE FOR JOINT BARS—LESS WEAR AND TEAR ON TRACK AND ROLLING STOCK—SMOOTHER RIDES FOR FREIGHT AND PASSENGERS. It also reduces the amount of welding to build up rail ends.

Each year railroads are flame-straightening thousands of joint bars by this Oxweld method. If your maintenance-of-way operations do not include this modern process, ask your Oxweld representative for details.

THE OXWELD RAILROAD SERVICE COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

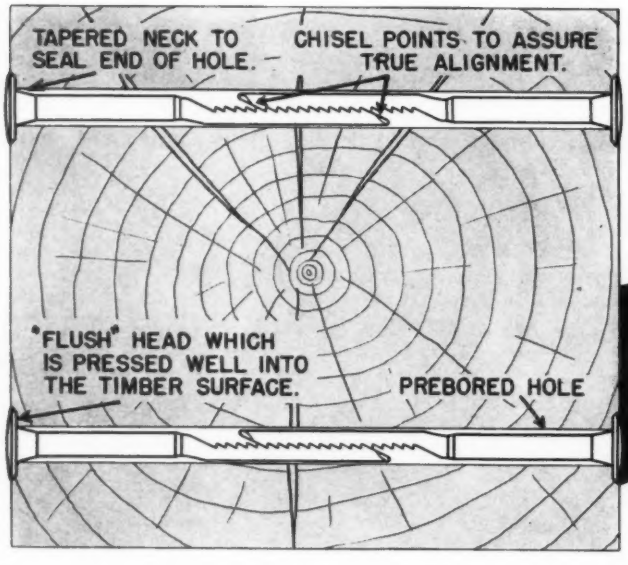
Carbide and Carbon Building Chicago and New York

In Canada:

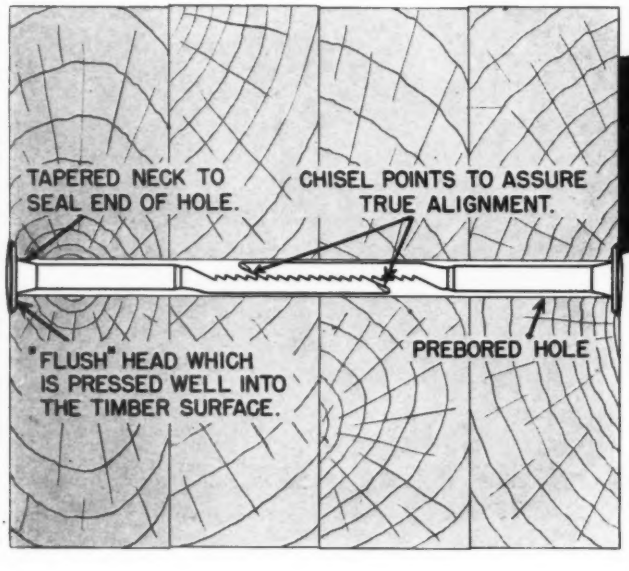
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS


TAPERED NECK TO SEAL END OF HOLE.
CHISEL POINTS TO ASSURE TRUE ALIGNMENT.
"FLUSH" HEAD WHICH IS PRESSED WELL INTO THE TIMBER SURFACE.
PREBORED HOLE

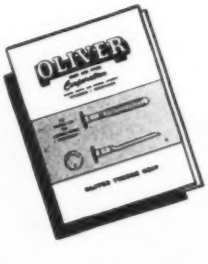
—for prolonging the life of split ties . . .


TAPERED NECK TO SEAL END OF HOLE.
CHISEL POINTS TO ASSURE TRUE ALIGNMENT.
PREBORED HOLE
"FLUSH" HEAD WHICH IS PRESSED WELL INTO THE TIMBER SURFACE.

—for fastening timbers in laminated construction . . .

The OLIVER TIMBER GRIP

The simplicity and effectiveness of the Oliver Timber Grip instantly appeals to the railroad man. We will gladly discuss with you how effectively you can use it to prevent or minimize tie splitting—or to fasten together the component timbers used in laminated construction.

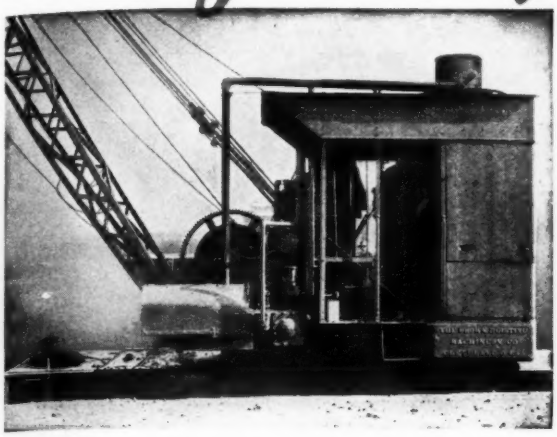


WRITE FOR BULLETIN
giving complete details of the Oliver Timber Grip.

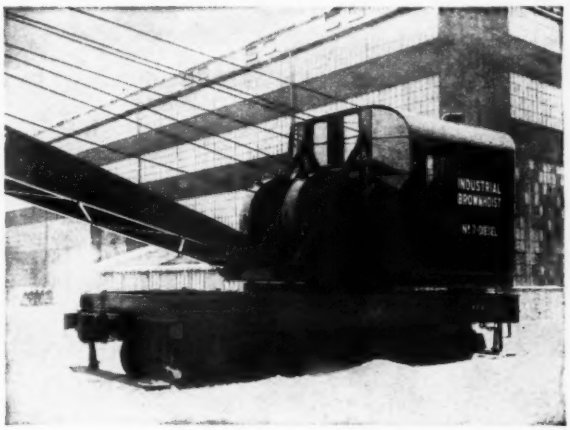
SOUTH TENTH AND MURIEL STREETS
PITTSBURGH 3, PA.

OLIVER
IRON AND STEEL
Corporation

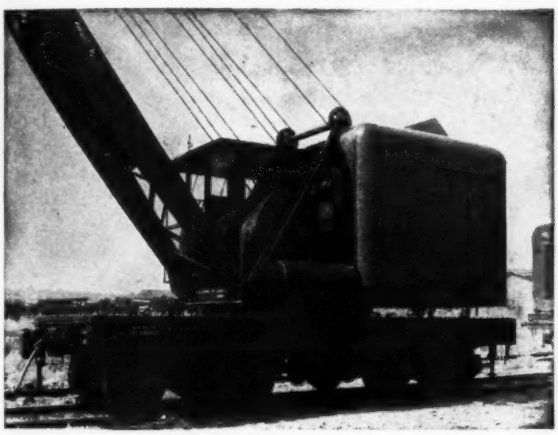
THE *Growth of the Cab* 1907 - 1947



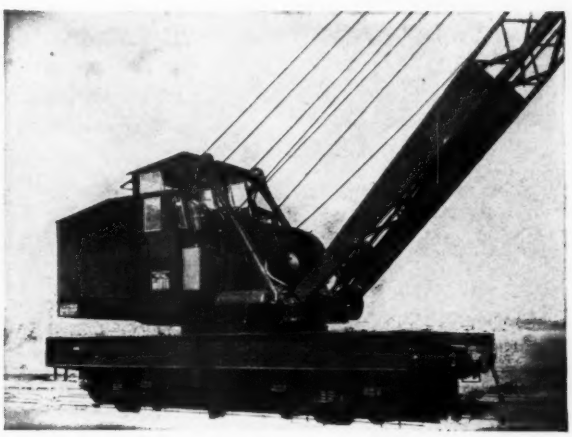
PRIVACY seemed to be the keynote of crane design in 1907. Hardly anyone could see the crane operator, boxed in by cab and caged in by rigging and tools, and *he couldn't see much of anything either.*



BY 1927, glass had caught up with locomotive crane cabs. The Brownhoist trend was to improved visibility, and windows were in vogue. Trouble was, *too much cab was still in the way.*



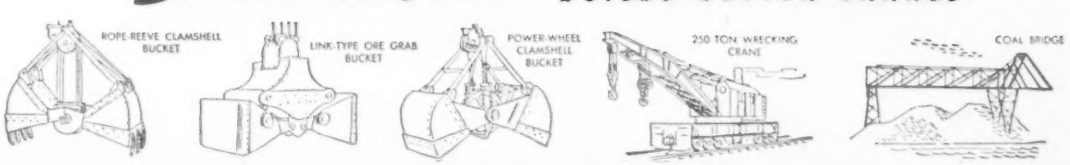
IN 1937, Brownhoist used the side-cab design. It set a new style in crane operation. An *over-the-left-shoulder look* was not only unfashionable—it was impossible.



TODAY, ten years later, 1947, Brownhoist has jolted industry by offering the ultimate in sensible, efficient locomotive crane cab design—the Monitor-type cab that affords the operator *360° visibility.*

In addition, Brownhoist cranes are equipped with rotating and travel friction disc clutches with one-point adjustment; roller bearings at all essential points; 14″ safety clearance between rotating bed and car body; one-piece cast steel bed; and many other important design and construction advantages. *Write for complete particulars.*

Brownhoist BUILDS BETTER CRANES

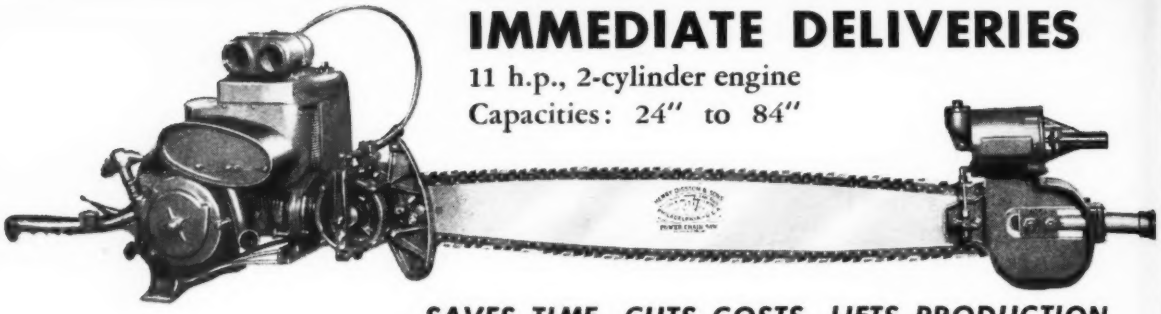


INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO • AGENCIES: DETROIT, BIRMINGHAM, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE, VANCOUVER, B. C., WINNIPEG, CANADIAN BROWNHOIST LTD., MONTREAL, QUEBEC.

DISSTON CHAIN SAW

with Mercury Gasoline Engine



IMMEDIATE DELIVERIES

11 h.p., 2-cylinder engine

Capacities: 24" to 84"

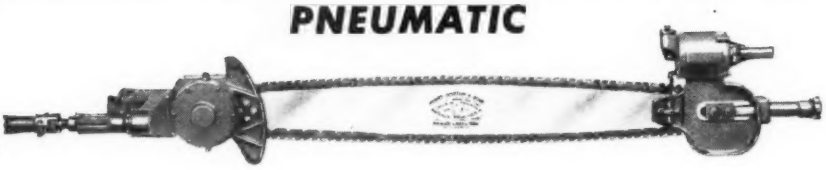
SAVES TIME, CUTS COSTS, LIFTS PRODUCTION

The Disston Chain Saw is a self-contained, portable, gasoline powered saw that can be operated in all climates. It is ruggedly built, light in weight, easy to operate and cuts from all angles. It results in greater production and economy wherever heavy timbers are cut . . . in the forests, on railroads and contracting jobs; at shipyards and manufacturing plants of many kinds.

The engine, designed specially for chain saw operation, has more power per pound of weight than any other chain saw engine. It is manually controlled to utilize full engine power under all cutting conditions. Other features include: die-cast engine cylinders and cooling fan; gear driven magneto; fuel filter built in tank; air filter; positive acting multiple disc clutch; many others. And the tough, durable cutting chain gives perfect contact with drive sprocket under all load conditions.

DISSTON CHAIN SAW

PNEUMATIC



HUNDREDS OF APPLICATIONS

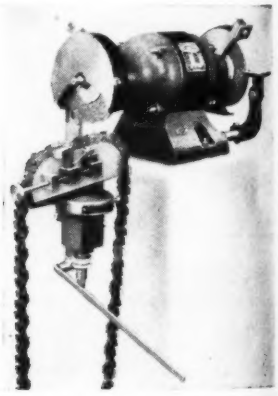
The Disston Chain Saw—Pneumatic—is a powerful, light weight, air-driven tool that speeds up timber cutting for general contractors, railroads, shipyards. Can be operated wherever compressed air is available, even under water. It requires no previous experience to operate, and is ready for work the instant connection is made with air supply.

Gear housing and saw mechanism may be rotated in either direction—handle grips remain in a horizontal position with relation to each other for any type of cutting. Equipped with heavy-duty, vane-type motor. Tail stock, guide rail and cutting chain are the same as those used on Disston gasoline powered saw. Requires little maintenance for it is built for long, economical service.

3½ and 5 h.p. motors in 24" and 36" sizes. The 3½ h.p. motor requires 90 cu. ft. of air per minute, at 90 lbs. pressure per sq. in.; the 5 h.p., 150 cu. ft. of air per minute at 90 lbs. pressure per sq. in.

•

Write for further particulars, or see your Disston Distributor, who carries complete stocks of parts and is prepared to render prompt and expert service.



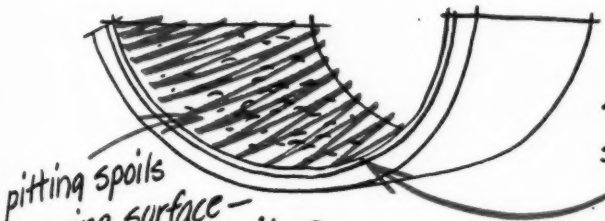
DISSTON ELECTRIC CHAIN SAW SHARPENER

enables you to do your own sharpening . . . quickly, accurately. Saves time. Keeps chains in first class condition.

HENRY DISSTON & SONS, INC., 841 Tacony, Philadelphia 35, Pa., U.S.A.

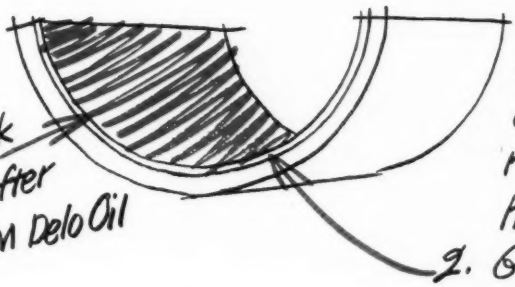
LUBE MEMO

Why it's smart to avoid "metal eating" lube oils



Heat and air in Diesels make many oils corrosive so they "eat" lead from structure of alloy bearings

pitting spoils bearing surface — leads to failure



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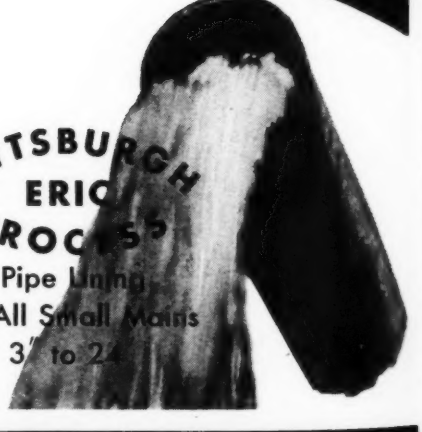

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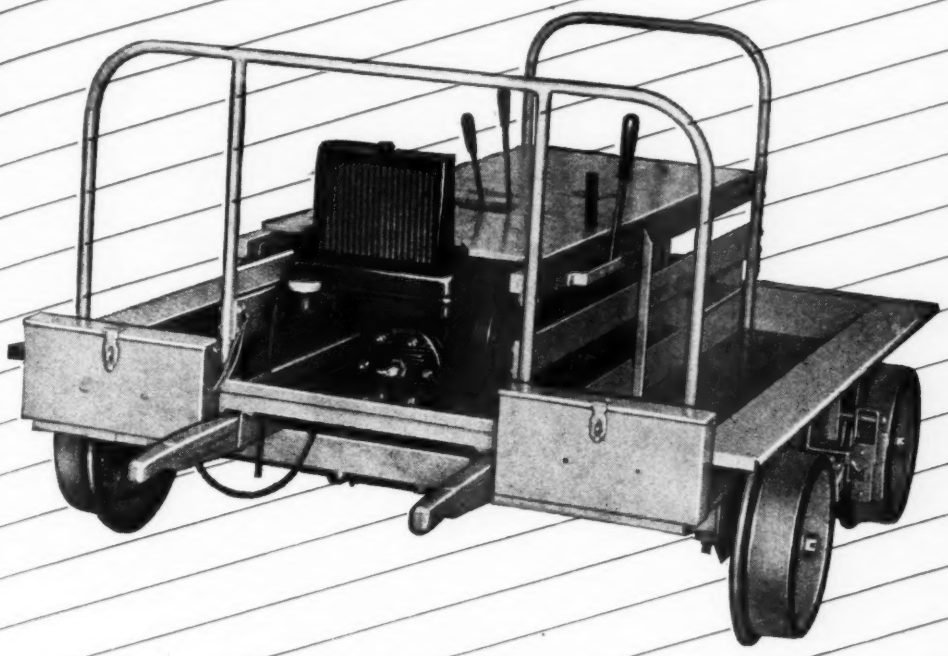

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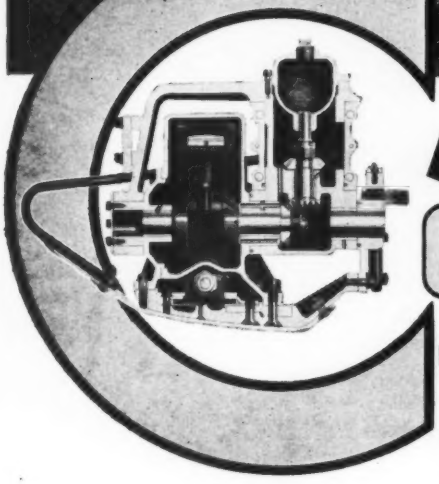

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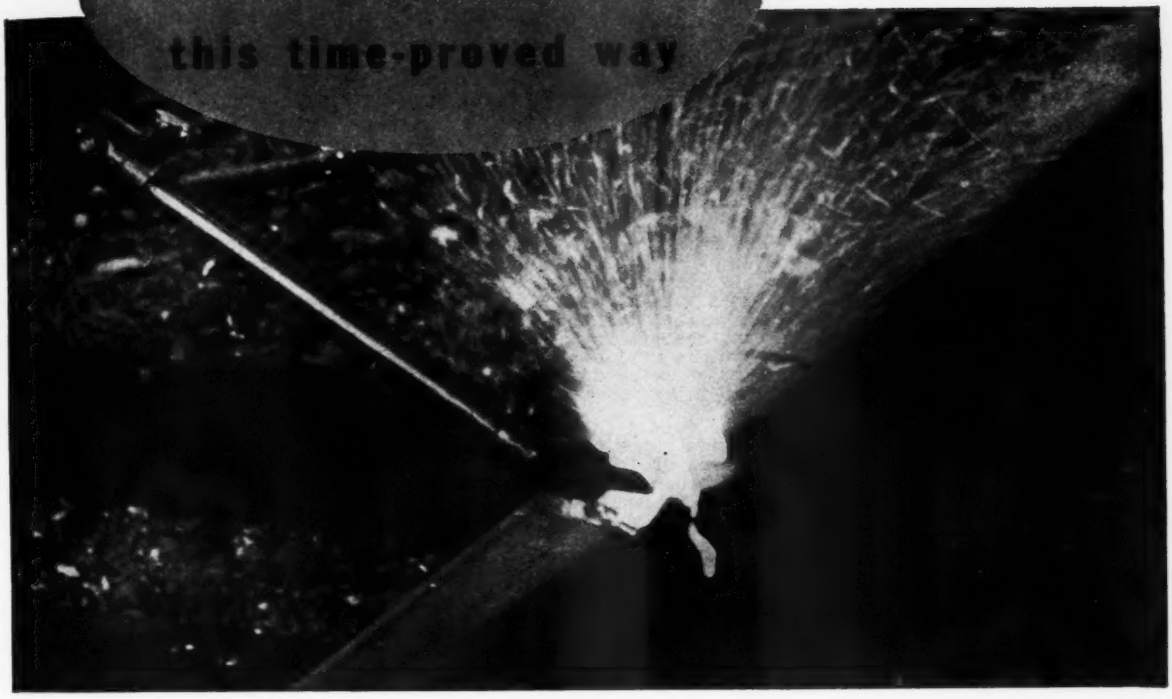

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No. 224 of a Series

Railway
Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO 3, ILL.

Subject: September Conventions

August 1, 1947

Dear Readers:

As the Roadmasters' and Bridge & Building associations complete plans for their concurrent conventions at the Hotel Stevens, Chicago, September 16-18, Railway Engineering and Maintenance is again throwing its full weight behind their activities to help make these meetings a huge success. Likewise, we are cooperating to the fullest extent with the Track Supply Association and the Bridge & Building Supply Men's Association to the end that their joint exhibit of equipment and materials in conjunction with the conventions will be the most successful and beneficial. What are you planning to do relative to these important events, if you are not already contemplating an active part in them?

This question can well be raised in these pages because, almost without exception, all of you who read these pages regularly should be interested in, and stand to benefit from, the activities of these associations. And it is asked here because, unless all of you get behind these associations—effective as they may be without your support—they will never be what they can and should be, in your interest and that of the railroads.

Yes, Railway Engineering and Maintenance, as in the past, plans to devote its October and November issues almost exclusively to the activities of the conventions —the Roadmasters' in the October issue, and the Bridge & Building convention in the November issue—with complete transcripts of the committee reports in each case. Furthermore, our advertising pages in both of these convention specials will constitute a veritable exhibit in print of equipment and materials of special interest to you. But valuable as all this will be, it can never take the place of, or substitute in full for, attendance at the conventions and exhibit.

At the convention you will be able to rub shoulders with men having like problems from all parts of the country; you will be able to hear the technical reports, addresses and papers at first hand; and you will be able to enter into the discussions that will follow these presentations. At the exhibit, which will be in the same hotel, with 88 companies already planning to display their products, you will see the latest in those materials, machines and appliances that have been designed especially to assist you in your work. Furthermore, as on few, if any other, occasions during the year, you will be able to discuss your problems with the designers and builders of these products.

If you will need room accommodations while in Chicago, don't delay in contacting the Stevens, stating your requirements and naming one or both associations. This is imperative. If you must, you can always cancel such reservations, but you may not be able to get suitable accommodations later.

To those of you who, under any circumstances, will be unable to attend the conventions and exhibit, you can have the satisfaction that in your October and November issues of Railway Engineering and Maintenance you will get prompt and comprehensive reports of these events, and that we will endeavor to make these issues better than ever before.

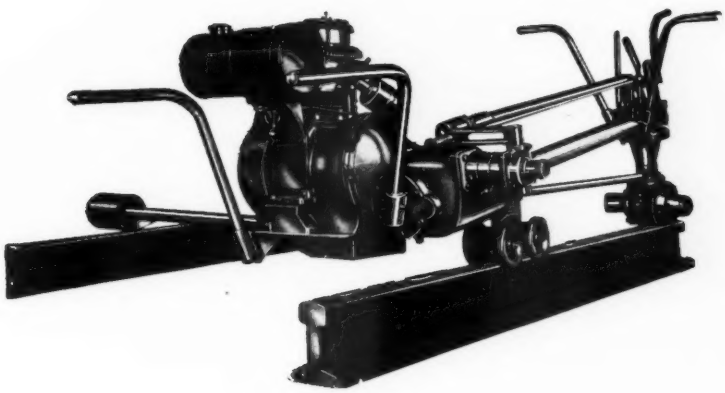
Sincerely,

Neal D. Howard

NDH:jb

Editor

Periodical tightening of track bolts with Raco Power Track Wrench



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Railway Engineering and Maintenance

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AUGUST, 1947

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Editorials - - -

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Railway Engineering and Maintenance

Nationalization—

A Serious Threat to the American Railways—Unless . . .

Few on the railways are in favor of government ownership and operation. Public sentiment, likewise, runs definitely in favor of private ownership. Despite this, there is grave threat of nationalization of the railways of this country—indeed, of all public transportation agencies, and perhaps other industries. If this comes, it will not be because the majority wants it, but because, while the majority "sleeps", or "scatters its shots", a militant minority, often with selfish interests, hammers away at a single objective.

To raise this question may be surprising, if not shocking, to many on the railroads. Engrossed in their daily tasks and personal interests, the thought of socialism engulfing their industry is foreign, if not entirely new, to them. That the government did not take over and operate the railways during the recent war, as during World War I, allays any concern that, what is now happening in Great Britain, where the railways are on the eve of being nationalized by an Act of Parliament, could happen here. They are totally unaware that, with the British railways in the hands of the government, the United States will be the only major country in which the railroads will still be owned and operated by private corporations. This ignorance of the spread of socialism among those who favor free enterprise, combined with the resulting passive resistance to this advance, is cause for serious concern.

As recent as late June of this year, a body known as the Progressive Citizens of America, meeting in a two-day session at Chicago, adopted an economic program calling for public ownership of the nation's coal, railroad and electric power industries. Displaying the destructive attitude frequently adopted by such minority bodies, overlooking all of the advantages of the "American way" that has made our country the greatest in the world, and disregarding the problems of industry during and since the war, the P.C.A.'s board of directors branded public utilities, the railroads, and certain other basic industries as backward, inefficient, and selfish. The association apparently prefers the national bureaucracy and political domination inevitable in nationalization, which is evident in so many countries of the globe, and which gained such a foothold in our own country during the war, attended, as subsequently proven, by instances of inefficiency, incompetence, waste, favoritism, and even collusion and graft.

Fortunately, the vast majority of the American public, and of railroad employees, wants to maintain the traditional "American way", with private ownership and operation of all industry, properly regulated in the public interest. But wishing will not make it so. In the face of those who, in ignorance or malice, would tear down our long-established institutions, they will have to assert themselves in no uncertain terms through their ballots and their duly elected representatives.

In a statement released on July 7, Harry A. Wheeler, president of the Railway Business Association, pointed out that "Our American way of life through retention of the principle of private ownership will depend hereafter upon what Congress may do to assure the perpetuation of that principle *in transportation.*" "Shall we here in the United States," he asked, "escape what Britain is undergoing today in making transportation, public service, and other basic industries government monopolies under a socialistic economy?" "If we do," he said, "it will be through a militant public sentiment demanding that public authority (Congress, commissions and courts), upon whom is conferred the power

to impose costs and to fix rates, prices and procedures, shall, with diligence and promptness, move to equalize the effects of these impositions."

These views were expressed in introducing a statement entitled "Solvent Railways as a Bulwark Against Socialism", by P. Harvey Middleton, executive vice-president of the association, with headquarters at 38 South Dearborn Street, Chicago. In this statement, the association, which comprises companies manufacturing railway supplies and equipment, gives staunch support to the present efforts of the railroads to achieve a 6 per cent return on their investment—after having earned an average return of only about 3 2/3 per cent for the past 25 years. This statement asserts that railroad earnings high enough to insure solvency of the industry offer the sole means of avoiding nationalization—and not only of the railways, but of all forms of transport, and perhaps other industries. The railroads, it points out, constitute the front trench which, if captured, will lead to the seizure of other basic industries.

To drive an essential industry into bankruptcy through inequitable taxation and regulation, or the less obvious restrictions against adequate rates and earnings, ostensibly in the public interest, is the surest way to nationalization of that industry—and the railways are being driven along that road, followed closely by other forms of transportation and public utilities. The disaster that this portends demands the attention of every railway employee.

What can the employee do? The greatest contribution that he can make at the moment is to back his road's management in its fight for fair treatment and adequate rates, while at the same time so conduct himself in his work as to make the charge of "railroad inefficiency" ridiculous.

Soft Track—

Are You Pouring Sand Down a Rat Hole?

IN SECTIONS of the country that this year have been subject to an unusually wet spring and early summer, many track maintenance men have been dismayed to find that the excessive rainfall has caused the condition of their tracks to deteriorate at an unexpectedly rapid rate. On at least one road some stretches of track on which the ballast was cleaned only a year ago have already developed muddy conditions, with low joints and all the other ills attendant on such a condition.

This situation is mentioned only for the purpose of emphasizing the fact that "soft" track is still very much of a headache for track men on many roads. This is true in spite of the fact that many measures have been devised and are in successful use for stabilizing such track, including roadbed grouting, subsurface drainage, pole driving, deep ditching and others. All of these are being used more or less extensively and all have produced satisfactory results under certain conditions. Why is it, then, that large sums continue to be spent in so many locations to deal with the effects, rather than the causes, of unstable track?

This question may have several answers. One of them lies in the likelihood that some railroads, for one reason or another, are not making maximum use of the available effective methods for stabilizing the roadbed. Another is that doubtless there are roadbed conditions, leading to soft track, which cannot be satisfactorily corrected by any one of the methods now in general use. If this analysis is correct, there are two alternatives to be considered: (1) To make more extensive use of the proven measures already available; or (2) to concentrate on the development of new or improved measures for application to those locations where it is held that available methods would be ineffective.

The present is a good time to be giving this matter careful consideration. With wage rates still in the grip of an upward spiral, the urgent need for keeping track maintenance costs down would seem to dictate a policy of correcting fundamental weaknesses rather than pouring sand down the proverbial rat hole by trying to keep track up on an unstable foundation.

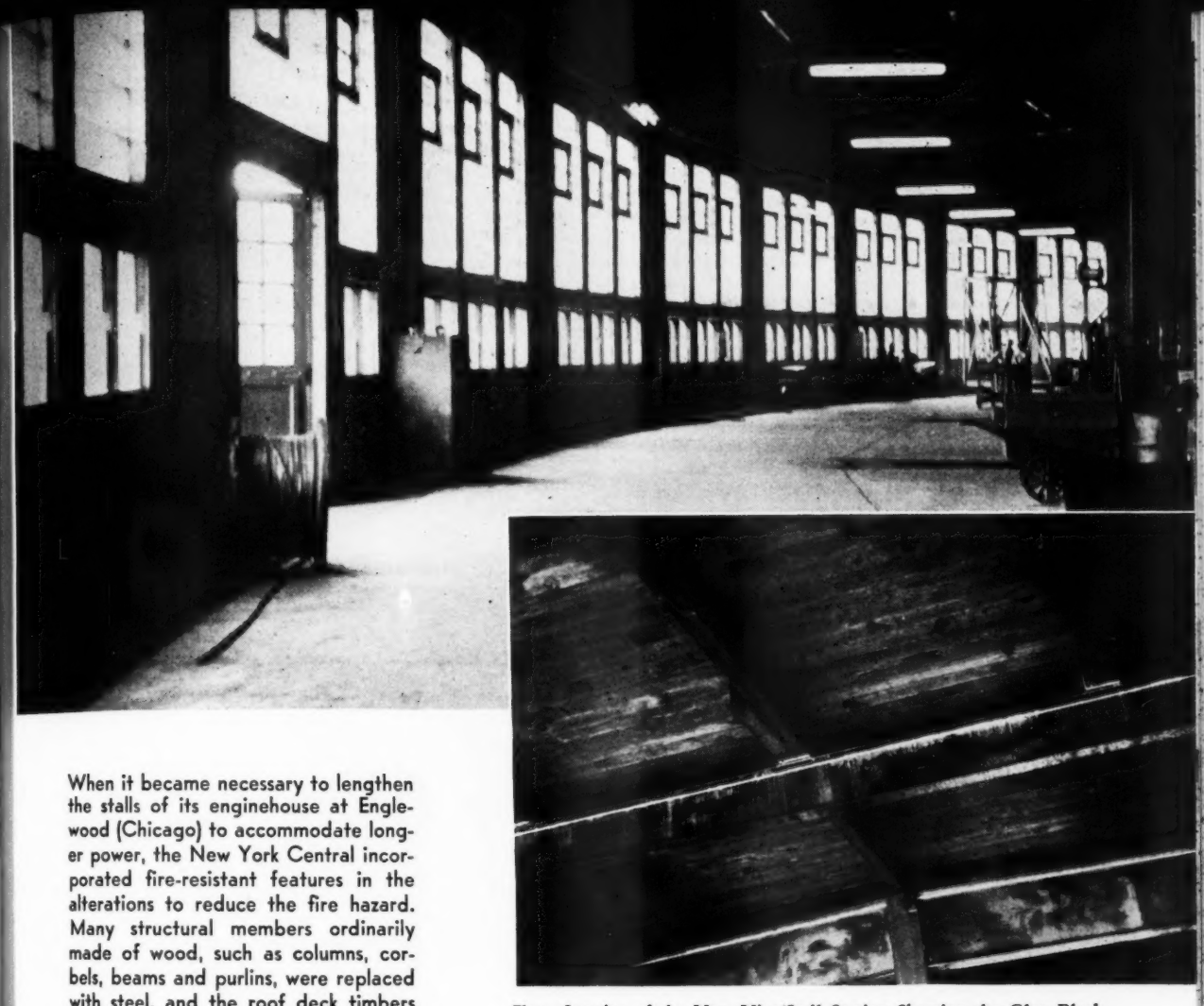
Supervision—

A Practical Lesson in Human Nature

THE PROBLEM of effective supervision of maintenance work—or any kind of work for that matter—is a many-sided one, but when the subject is boiled down to details there is one that looms as highly important. We refer to the desirability of the supervisor avoiding, insofar as possible, an uncompromising or arbitrary attitude when dealing with his subordinates. Admittedly there are instances, involving negligence, incompetence or other failures, where the best results can perhaps only be achieved by such an attitude. On the other hand there are numerous instances in which the supervisory officer can achieve the best results only by giving his men a chance to express their views and by exhibiting an impartial attitude when considering their views.

What we have in mind in this respect can best be cited by a concrete example. A maintenance officer had issued instructions to the effect that when building up rail ends by welding, the joint bars should be reversed immediately in advance of the work and before the limits of the welds were marked. On an inspection trip he found that one gang was not following these instructions, apparently because the supervisor did not think it would be of benefit in reducing the amount of welding required. Instead of taking the supervisor severely to task for ignoring his instructions, the officer suggested a test in which, using a straight edge, a joint was to be marked for welding, after which the joint bars were to be reversed and the rail ends again tested with a straight edge to determine if there had been any change. This was done, with the result that the affair was settled amicably and to the satisfaction of all.

The question of whether the officer or his supervisor was right is not important to this discussion. The important thing is that the officer's broadminded attitude was immeasurably more effective in getting lasting results than if he had been demanding and dictatorial. Herein lies a practical lesson in supervision which puts results ahead of all other considerations.



When it became necessary to lengthen the stalls of its enginehouse at Englewood (Chicago) to accommodate longer power, the New York Central incorporated fire-resistant features in the alterations to reduce the fire hazard. Many structural members ordinarily made of wood, such as columns, corbels, beams and purlins, were replaced with steel, and the roof deck timbers and sheathing were given a decay and fire-resistant treatment.

Top—Interior of the New Nine-Stall Section Showing the Glass-Block Panels. Inset—The Underside of the Roof, Showing the Fire-Resistant Treated Wood Decking and Nailers on Steel Purlins

Rebuilt Enginehouse "Fire-Proofed" on the New York Central

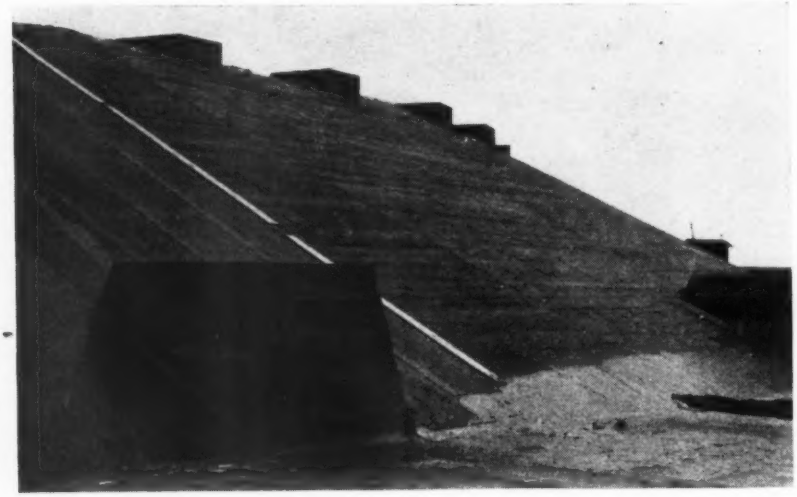
IN A large program of improvements at its Englewood (Chicago) Ill., engine terminal, the New York Central is completely rebuilding its 30-stall enginehouse to meet present conditions. In this, 20 stalls of the original house are being converted into 10 longer stalls, 10 stalls are being abandoned, and an entirely new 9-stall unit is being built. A feature of this work is the employment of fire-resistant construction throughout, including the use of considerable structural steel and wood given a special fire-resistant treatment. Use of the steel was made possible by the elimination of sulphuric fumes and gases that would attack steel by incorporating a direct-steaming system in the house, serving all stalls, which will preclude the necessity of having locomotives with fires in them within the building. Also included in the improvements are the enlargement of the existing power plant, the construction of two double-track wet cinder pits served by an overhead crane, and the relocation of the various tracks serving the house and the cinder pits.

Longer Stalls Needed

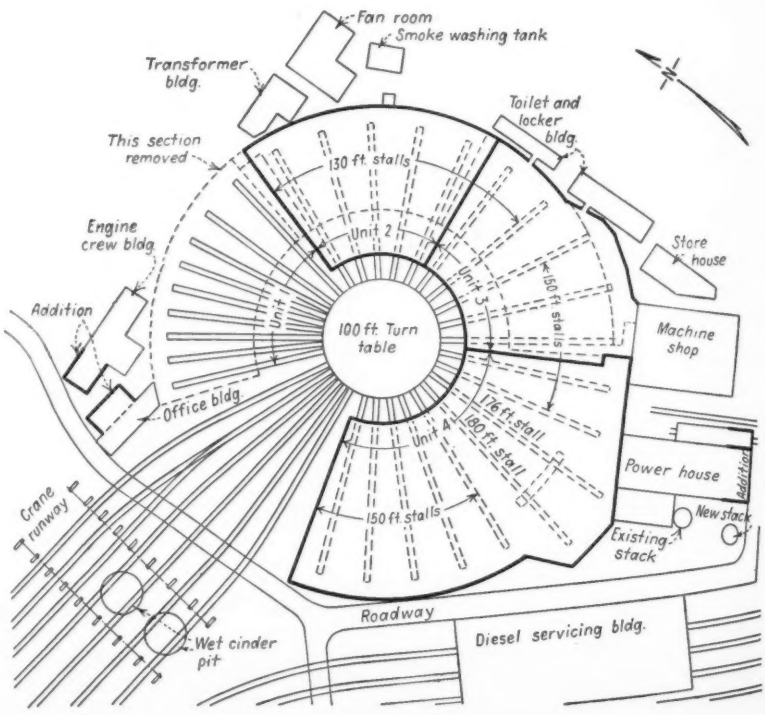
The existing enginehouse at Englewood contained three sections, each with ten 93-ft. stalls, supplemented by 16 radial storage tracks, all served by a 100-ft. turntable. Although fewer locomotives are now serviced at this location than when the house was built, the longer power now in use could not be accommodated within the existing building. As a result, each locomotive had to be turned when work was required on both its front and rear ends, resulting in increased expense and servicing time. The need for additional facilities was not for more stalls as such, but for stalls of sufficient length to accommodate the larger power, such as the S-2 class locomotives, now in use on the New York Central.

Several important considerations were involved in rebuilding and modernizing the enginehouse. In the first place, being located in a highly

congested urban district, it was essential that the new construction be made as fire-resistant as possible. Furthermore, due to the nearness of adjacent permanent facilities, lengthening of the stalls by moving the outer wall was impracticable, leaving the only possible means of obtaining the additional length required that of moving the inner wall toward the table. However, by advancing the inner wall approximately 38 ft., it became necessary to relinquish the use of every alternate track to maintain proper side clearance at the door openings. Even this expedient did not afford tracks and pits of sufficient length for servicing the long Class S-2 power handled at the house, nor did it provide room for the installation of a drop pit table. Therefore, to secure the longest tracks desired, it was decided to construct an extension to the enginehouse at the location occupied by the 16 outdoor radial storage tracks, where an adequate amount of space was available.



Left—Roof Decking Before Applying the Built-Up Roofing. Below—General Plan of the Rebuilt Roundhouse and the Adjacent Buildings Showing the Additions (Heavy Lines)



Done in Four Units

In rebuilding the house, the work was divided into four separate units, with Unit One including the first ten stalls of the original house, which was to be abandoned, however, leaving nine of its tracks for outside storage purposes. Units Two and Three were the remaining two 10-stall sections of the original house, which were entirely rebuilt by moving the inner wall 38 ft. toward the table and extending the pits some 43 ft. Unit Four was that portion of the area occupied by the original 16 storage tracks, upon which site a new 9-stall extension was constructed. By adopting this arrangement, the rebuilt house includes two 5-stall sections in the former house, with a total of seven 130-ft. stalls and three 150-ft. stalls, and the new 9-stall section, with seven 150-ft. stalls, one 176-ft. stall and one 184-ft. stall. Of the house proper, Unit Four is practically complete, while the work of reconstructing Units Three and Two is now in progress. The entire work is expected to be carried to completion during the current year.

Unit Four of the work was undertaken first, thereby maintaining the original house intact for operations during the construction. Furthermore, this plan provided for the substitution of each completed section for one that must be rebuilt, making it possible to maintain adequate facilities for normal operation of the terminal during the entire period of construction.

Fire Hazards Removed

In the house extension as built, 12-in. steel H-columns are supported on concrete caps over clusters of concrete-filled metal piles, 30-ft. long, driven to an average penetration of 28 ft. The roof beams, varying in size from 15 in. to 30 in., and roof purlins, ranging from 12 in. to 24 in., are wide-flange steel sections, but the sub-purlins, nailers and roof sheathing are of wood. All wood members and sheathing were given a decay and fire-resistant treatment. The roof sheathing is of 3-in. D & M lumber, while the sub-purlins and nailers are 4 in. by 8 in. and 4 in. by 6 in., respectively, in conformance with local building codes.

The center section of the roof is pitched to form a peak which provides a pocket for ventilating purposes, while the remainder of the deck, on each side of the peak, is relatively flat. The slope of the peak section is on a rise of 6 in. in 12 in., with that of the remaining deck surface being ½ in. in 12 in., sloping upward toward the peak. The flatter

Interior of the New Section Showing the Steel Framing and the Lighting Arrangement

decking is covered with a 5-ply tar and gravel built-up roofing, while the peak portion of the roof is surfaced with 5-ply built-up roofing with a smooth surface.

The panels of the outer wall are of brick, enclosing glass block windows with horizontally-hinged ventilating sashes in both their upper and lower areas. The inner wall is a series of stall-openings, each with double, two-fold wood doors, with curtain walls of glass block above them. Both walls are supported on pile foundations. Adequate ventilation at each stall is assured by the installation of three 30-in., asbestos-protected metal roof ventilators with dampers.

The nine stalls in the new building have lengths of 150 ft., except the two stalls served by a 50-ton drop table, which are 176 ft. and 184 ft. long, respectively. The floor section between all pits is of reinforced concrete, 9 in. thick, crowned ¾ in. at the column lines and sloped to the sides of the pits.

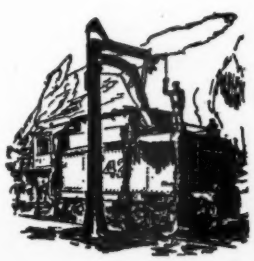
Rebuilt Units

The work on Units Three and Two is now in progress and involves essentially the same type of construction as that used in the new extension, with some minor variations to suit the shorter building. The only facilities being re-used are the pipe ducts, foundations for the outer walls, and half the number of pits—the remaining pits, however, in each case requiring a 43-ft. extension and a new floor to transfer the drainage to each end. New brick and glass block inner and outer walls are being erected, and new fire walls constructed between the three adjoining units, each containing a tin-clad, automatically-closing, fire door.

General heating of Unit Four is effected by means of five-way unit heaters, supplemented by steam coils for direct radiation in the inspection pits. Units Three and Two will be heated by forced hot air as at present, utilizing the existing ducts, extended where necessary. Interior lighting throughout the entire building will be by means of double rows of fluorescent tubes along the column lines between stalls.

Other Features

As pointed out earlier, the installation of the direct-steaming system made possible the use of structural steel in rebuilding the house. With this system locomotives enter the house under pressure remaining in their boilers after the fires have been pulled, and are subsequently recharged with sufficient steam through the system to allow them to be moved out of the house to a "make ready" track, where they are fired up.



In addition to the foregoing, other improvements at the terminal include two circular wet cinder pits, 32 ft. 6 in. in diameter; three reinforced concrete engine washing platforms, 125 ft. long; and a 30-ft. by 44-ft. extension to the power plant, involving two new 927-hp. steam boilers and a 175-ft. brick chimney. Furthermore, the inbound and outbound tracks and their component switches were respaced and rehabilitated to provide a completely revamped engine terminal. The new cinder pits are served by an overhead crane with a 2-yard clamshell bucket on a new 160-ft. runway which extends over both the tracks and an adjacent driveway, permitting cinder disposal by either car or trucks.

Plans for the new enginehouse and other facilities were prepared under the general direction of E. A. Dougherty, chief engineer of the New York Central, Lines west of Buffalo, and H. R. Aldrich, assistant engineer of buildings. Supervision of the actual construction is under the direction of H. W. Jordan, assistant engineer. The work is being done under contract by the Ellington Miller Company, Chicago, general contractor, with H. M. Dodd, general superintendent, in charge.

(Omaha World-Herald Photo)

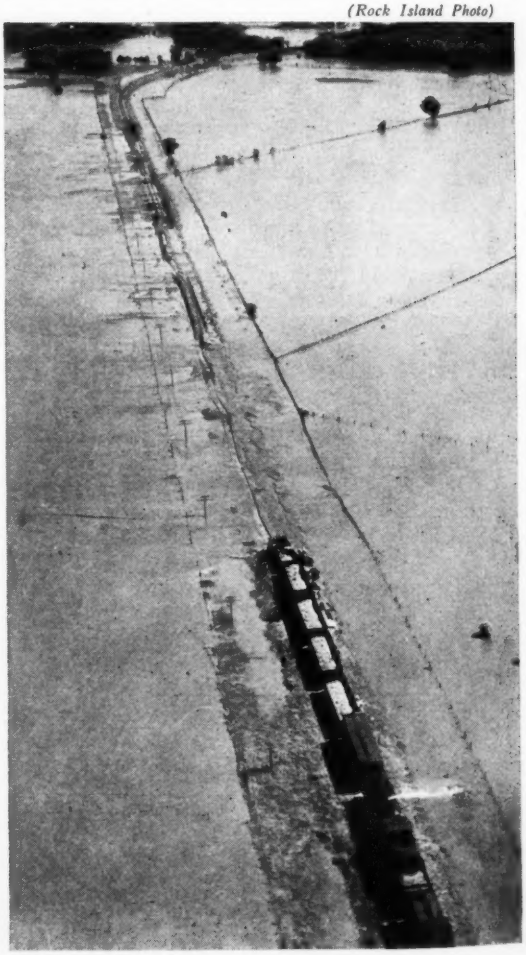
Flash Floods on June 22 Washed Out the Omaha-Denver Line of the Burlington at Several Locations. This Scene is Near Cambridge, Nebr.

Washout on a Branch Line of the C. & N.W., at a

Flood Damage

Left—Main Track of the Milwaukee at Ottumwa, Iowa. This Stretch Was Washed Out on June 7, But Was Saved from a Second Flood on June 15 by the Use of Sand Bags. Below—Washout on the Rock Island near Carlisle, Iowa

(Rock Island Photo)



Below—Efforts to Save this Dike Carrying the G.M. & O. Main Line near Glasgow, Mo., Failed on June 26, When the Missouri River Broke Through It, Destroying Several Hundred Feet of the Line

(Press Association, Inc.)

Point Between Omaha, Neb., and Winner, Mont.

Floods on the Missouri Pacific in Illinois Interrupted Service for Several Days

Widespread on Mid-West Roads

WIDESPREAD damage, affecting both main and branch lines, occurred on many of the railroads traversing southeastern Nebraska, central and southern Iowa, northern and eastern Missouri and parts of other states in the Middle West, as a result of floods caused by a series of unusually heavy rains throughout these areas during June. Starting early in the month, when severe storms at scattered locations caused small washouts of a local character, the territory was subjected to general heavy rains on June 5 and 6, which resulted in a rapid rise of water in several rivers in Iowa.

Hardly had the waters from these rains subsided when further heavy rains occurred to cause new floods in the territory already affected, driving the same streams to unprecedented heights and, at the same time, causing extreme high water, including flash floods, in the other areas mentioned. Most of the flooded streams empty into the Missouri and Mississippi rivers, both of which attained all-time highs at various points.

Virtually every railroad in the affected territory was damaged to some extent by high water, slides, roadway and bridge washouts or by wave action. Interruptions to service occurred at numerous points, necessitating the detouring of trains over little-used branches or over other roads, and the situation in this respect changed rapidly as washouts occurred on the lines being used as detour routes.

Shown on these pages are photographs, taken at widely scattered locations, depicting high water and flood damage on several roads.

Above—Rising Waters of the Mississippi Cover the Tracks of the Frisco at Cape Girardeau, Mo. Below—Water-Front Facilities in the St. Louis Area Were Inundated When the Mississippi Reached the Highest Level Ever Recorded. This View Shows High Water Over Part of Wiggins Yard of the Terminal Railroad Association of St. Louis.

Milwaukee Uses

Tie-space marking in connection with ballasting and out-of-face surfacing operations is speeded up with template to the extent that two men can mark 10,000 ft. of track in a day. Template also assures proper distribution of the ties in the panel, despite imperfect staggering of joints, and rails are marked for right-angle tie installation.

Above—Ties Being Spaced Immediately Behind a Template on a Section of New Track Construction

Right—Men Using a Template to Mark the Correct Spacing of Ties in Advance of a Ballast Gang

LONG a proponent of the use of large labor gangs, the Milwaukee has studied these organizations in the finest detail to make them as efficient as possible, and has equipped them with all of the power equipment and labor-saving devices that seem necessary to expedite their work. Some of the devices have been conceived and developed, with the encouragement of the road, by men supervising or working in the gangs to facilitate their own work, and have subsequently been adopted as standard for other gangs. One of these labor-saving "wrinkles," which has been used for many years on the Milwaukee by both its ballasting and out-of-face surfacing gangs, is a tie-spacing template, devised to expedite the correct marking of tie-spacing in rail panels. This device, which is provided with line and letter graduations, permits the proper spacing of ties on both tangents and curves, regardless of the imperfect staggering of the rail joints.

With the tie-spacing template, two men can mark tie centers accurately for as much as 10,000 ft. of track in one day, keeping well ahead of the advance units of the main gang. In fact, it is not unusual, at times when the men get too far ahead of the gang, to stop them in their tie-marking activities and to assign them to the removal of rail anchors, preparatory to the tie renewal and spacing work.

Separate tie-spacing templates are required for the prevailing rail lengths particular to the line being worked, i.e., one template is needed for track laid with 39-ft. rails, another for 33-ft. rails, and two others for the 36-ft. 10-in. and 30-ft. 10-in. (sawed) rails. The various templates are essentially rectangular wood frames 5 ft. 1⅝ in. wide, varying in length from 18 ft. to 21 ft. 8 in., depending upon the length of rails with which they are to be used. They are all made in two parts from dressed 2-in. by 6-in. lumber, and are diagonally braced at each end for rigidity with 1-in. by 6-in. boards. The two parts, each a rectangular frame in itself, are joined by three 5-in. extra-heavy strap hinges.

About two-thirds of the upper faces of the side boards are beveled to a ⅜-in. thickness at their outer edges, to give surfaces more nearly normal to the line of vision of the men as they walk along the side of the track, and are stenciled with black and red graduations and letter markings on a white painted background. The width of the frames in all cases is such that the beveled edges are approximately flush with the outside edges of the rail heads, which places the graduations close to the points of marking on the rails. A wire rope with a handle is attached to the front end of the frame for dragging it from one rail joint to another as the work

Tie-Spacing Template

progresses. Six 2-in. by ¾-in. steel angles, 3 in. long, are fastened to the undersides of the side boards of the frames, with their ¾-in. legs downward and at track gage, to serve as sliding plates. For use with 39-ft. rails, the length of the template, the graduations of which are described in the following, is 21 ft. 8 in.

Template Marking

Before any lines and letters are painted on the beveled faces of the frame, the two parts are hinged together and the entire frame is painted white. The first step in marking the template is the painting of a red line across the width of the beveled face at standard joint spacing distance (half-rail length) from the front end of the frame. This line is designated by the letter S (for standard) painted in red on the surface of the side board above the red line—red denoting a key letter and line.

Since the Milwaukee uses the supported joint, with one tie directly under the center of the joint and the next adjacent tie each way on 18-in. centers, the next step is to provide the markings for the joint ties. This is done by painting a black line, extending 1 in. from the beveled edge, at a point 18 in. from the line S measured toward the front end, and another such line at a point 18 in. from the front end of the template, measured toward its rear. Each of these lines is also designated with the letter S, but stenciled in black. The distance remaining between these two black lines is then devided equally in accordance with the prevailing standard number of ties per half-rail panel, which, with 24 ties per 39-ft. rail on the Milwaukee, or 12 to the standard panel, involves the marking of nine more black lines, which are all lettered S in black. The opposite beveled face of the template is marked similarly so that all lines and letters on that side are exactly opposite corresponding lines and letters on the first-marked side.

The markings (see Fig. I) are now complete for using the template on track having 39-ft. rails with their joints exactly staggered, but they are not satisfactory for use on track having a lag or gain in the joint staggering. Giving consideration to this usual but imperfect joint spacing, the Milwaukee devised the template so that it could be used to meet this condition, by the painting of additional lines designated with different letters on the beveled faces in the following manner:

Returning to the rear end of the template and considering only one of the two sides, which are marked similarly, six additional key lines are marked in red at 4-in. intervals on each side of the previously established key line designated S. These supplemented key lines, starting with the line nearest the key line S, are lettered respectively A, B, C, D, E and F toward the rear end of the frame and G, H, I, J, K and L toward the front end (See Fig. II), all in red. The twelve 4-in. intervals are used because differences of 4 in. are considered close enough for all practical purposes, in determining the length of panel to be divided up, and the six intervals allow for a gain or lag of as much as 2 ft. in joint spacing.

With these twelve new key lines and letters established, the procedure then follows the same method used in marking the template for standard joint spacing. For example, in marking the template for spacing ties between staggered joints that are 8 in. further apart than the standard distance of 19 ft. 6 in., i.e., with the center of the rear joint occurring under red key line B, the first step is to fix the location of the inside shoulder tie (See Fig. III). This is accomplished by marking a short black line 18 in. from the red key line B, measured toward the front end, and designating it with a black letter B.

Since the black line previously established at the front of the frame, and marked with a black S, to fix standard joint spacing of 18 in. at that end, is also applicable regardless of the length of panel, it is designated in black with the letter B, as well as with the black letter S—in fact, when the marking of the template is completed for all of the key letters, this 18-in. line at the front end of the template will be lettered with all 13 key letters, in black, because it is used in common with each of them.

Following the establishing of the 18-in. shoulder tie marking B at the rear end of the frame, the distance between this point and the head-end joint tie line designated B is equally divided in accordance with the standard number of ties used in a half panel, which, again using the Milwaukee standard of 24 ties per 39 ft. rail, or 12 ties per panel, necessitates the

(*Continued on page 774*)

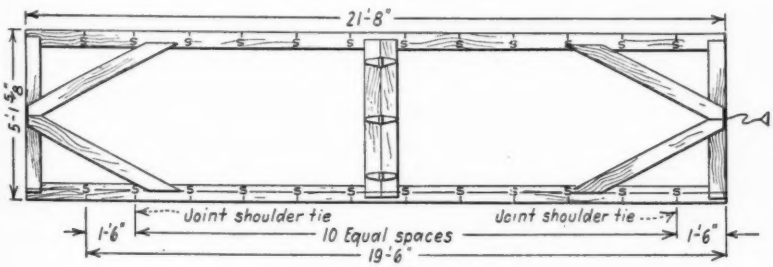


FIGURE I

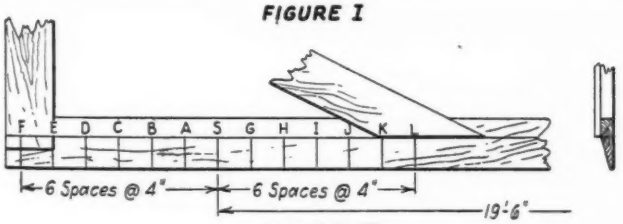


FIGURE II

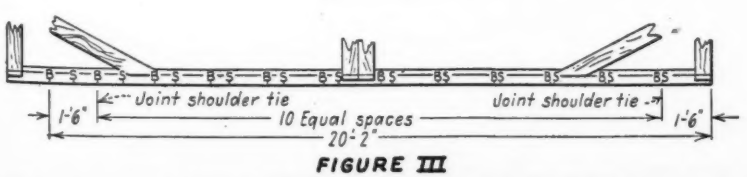


FIGURE III

Plan Views of a Tie-Spacing Template for Use with 39-Ft. Rails, Showing Details of Its Markings for Indicating the Proper Locations of Ties

Many Possibilities Offered by Sand in Crushed Stone Ballast

By H. W. PROTZELLER
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This article, originally prepared as an answer to a question which appeared in the What's the Answer Department of the June issue, briefly describes the conclusions the author has reached after making many tests and observations of ballast and the effect water has upon it. He believes these studies indicate that by adding sand to crushed stone ballast it can be made heavier, and thereby stronger; and yet dry so quickly by capillarity and evaporation that very little, if any, water from an average amount of rainfall will actually reach the subgrade.

BALLAST, of any type or character, is a strength element of the track structure. To be fully effective it must be capable of withstanding the heavy unit loads of modern, heavy, high-speed traffic. These loads are imposed on the ballast by the ties in quite a concentrated form, sometimes as great as 175 to 200 lb. per sq. inch. The ballast must receive these two loads and distribute them to the subgrade in such a manner that neither the ties nor the subgrade are damaged.

Unfortunately, ballast is subjected to a very great range of weather conditions. To secure a good track structure the ballast strength must be as nearly uniform as possible under all weather conditions. In addition to having the maximum supporting strength, ballast must hold the track in line and surface, and must possess a high degree of resilience.

The enemies of ballast are mainly water and dirt. Both of these may come from either above or below the ballast section. For many years we have studied and experimented with all kinds of ballast with the objective of securing a superior ballast composition. In our opinion it has now become necessary for the railroads to concentrate on increased ballast strength. Existing types of ballast now in common use have many inherent faults. Our research and experimental work indicates that if we can reduce the ravages of water and dirt, much of this objective will be attained.

The addition of a good grade of sharp sand to crushed stone ballast seems to offer great possibilities. It is impossible, within the limited space available, to do other than touch briefly on the "highlights" of this seemingly radical change from generally accepted ballast practices.

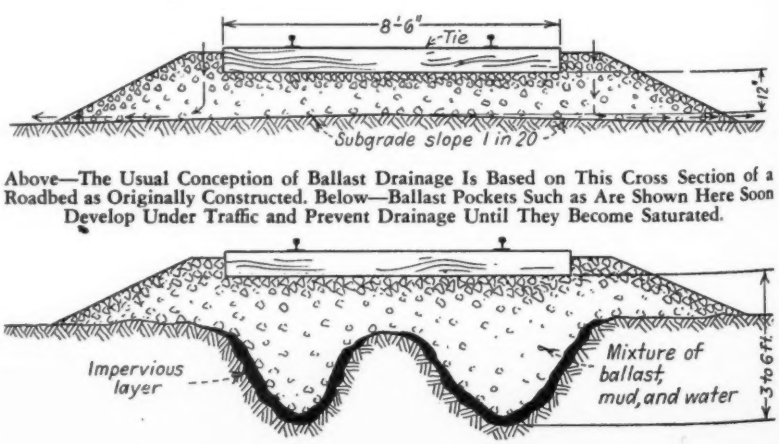
How Sand Increases Weight

Numerous tests prove that the measure of a good ballast is its weight per unit volume. Stone, suitable for crushing into railway ballast, weighs 160 to 185 lb. per cu. ft. in solid form. When crushed into the same size pieces, regardless of whether fine or coarse, a cubic foot will consist of approximately 58 per cent stone and 42 per cent voids, and will weigh 92 to 107 lb. per cu. ft.

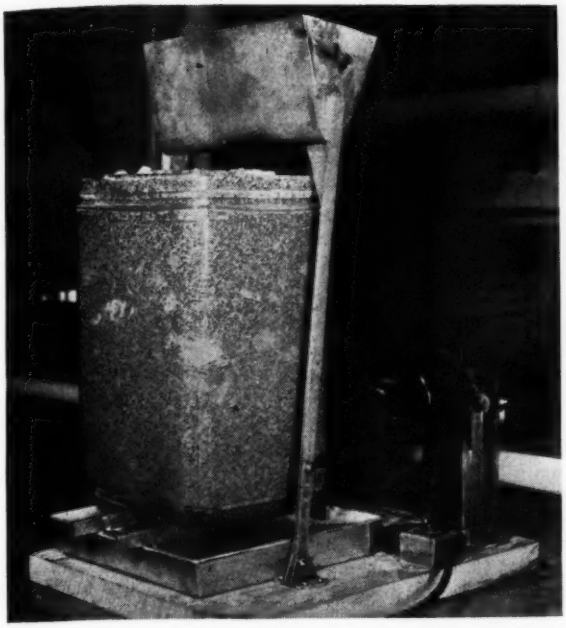
When a variety of sizes are in the same cubic foot, this volume of crushed-stone ballast offers space for the accumulation of 0.38 to 0.42 cu. ft. of mud and dirt. Generally this fouling matter is quite plastic when moist, and acts as a lubricant between the individual pieces of stone, permitting a high degree of movement between neighboring stone particles. This type of movement decreases ballast resilience and strength; and causes large track depressions under load, which mean "pumping" track.

In a similar manner, crushed stone ballast will "take up" a maximum of 38 to 42 per cent of sand to fill the voids. Suitable types of sand weigh approximately 100 lb. per cu. ft. and consist of approximately 62 per cent solid matter and 38 per cent voids.

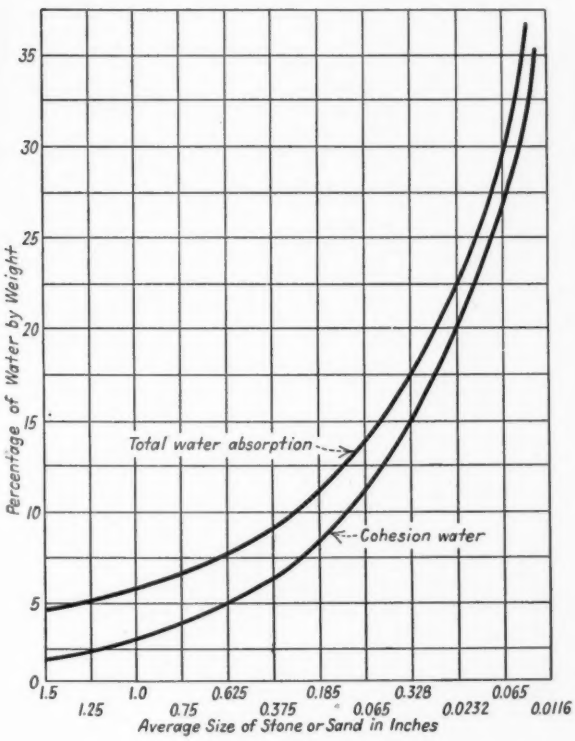
When the voids of crushed stone ballast are completely filled with sand, the resultant ballast consists of approximately 84 per cent solid material and 16 per cent voids, and will weigh from 134 to 149 lb. per cu. ft. Thus, by adding sand, the weight of the ballast has been increased 40 to 45 per cent and the voids decreased approximately from 42 per cent to about 16 per cent, greatly reducing the space for dirt accumulation. Furthermore,



Above—The Usual Conception of Ballast Drainage Is Based on This Cross Section of a Roadbed as Originally Constructed. Below—Ballast Pockets Such as Are Shown Here Soon Develop Under Traffic and Prevent Drainage Until They Become Saturated.



Left — This Rain Maker Was Used in Experiments to Determine the Water Absorption of Ballast. Below — Experiments Have Indicated that Total Water Absorption and Cohesion Water Vary with the Size of the Particles



sand does not decrease in strength when wet. It also possesses the ability to combine with any mud or clay that may accumulate in the ballast and thus materially decreases the plasticity. By so doing, the lubricating qualities of the mud in stone ballast are greatly reduced. For these reasons alone it appears that a combination of crushed stone and sharp sand offers a practical solution to the problems resulting from mud and dirt in the ballast.

Ballast Drainage

Probably the greatest advantage to be gained by adding sand to crushed stone ballast lies in taking tadvantage of those natural phenomena known as "capillarity" and "evaporation." As most commonly used, ballast drainage means a flow of water from the interior of the ballast section to the outside. I do not believe such a condition exists. This idea of how ballast drains is founded on the practice of showing cross-sections of the ballast and the roadbed as it existed when originally constructed, and the assumption that no changes occurred thereafter. It is a commonly accepted belief that all water falling on the ballast section drains downward until it reaches the subgrade, and then because the top of the subgrade is usually diagrammed in a manner that suggests rock or other impervious material, flows in an outwardly direction to the ballast toe line and out along the shoulder to the ditch. This can only be true if the subgrade is actually rock or other nearly impervious material.

It can be proved that the maximum pressure created in the ties by passing wheel loads is actually twice as much directly under the rail as anywhere else. This high pressure is applied to the subgrade through the ballast at almost lightning speed, and acts in a manner similar to a huge hammer falling on the subgrade. These repeated hammer blows drive the ballast and subgrade downward, directly under each rail, until pockets are created. If these actual conditions had been shown on the ballast and roadbed cross sections, the whole idea of ballast drainage would have been cleared up long ago, for then it would be seen that if the water drains down through the ballast, it will have to saturate the entire volume of each ballast pocket before any lateral drainage is possible.

Amount of Water Absorbed

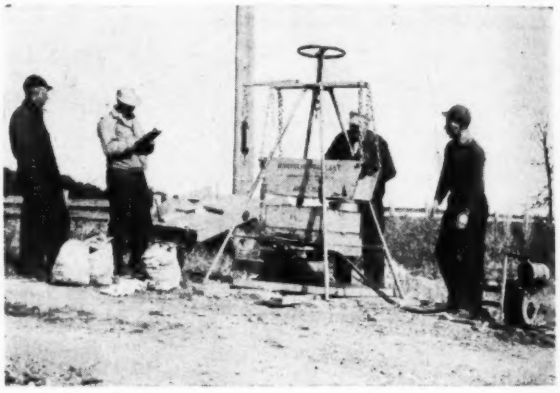
If the subgrade of a railway track were composed of natural soils, rolled and sloped, but without the ballast covering, most everyone would agree that when rain or water fell upon it, the soil would absorb all of the water it was capable of holding before any lateral drainage would take place. To show that this is also true when the ballast covering is put on the subgrade, let us assume a ballast section made up of pieces of clean stone ranging in size from fairly coarse to medium fine. We know definitely that, when a single piece of stone is wetted by water, two actions take place. In the first, a thin film of water forms on and covers the entire outside surface of the stone; and in the second, some of the water penetrates into the interior of the stone. The more irregular the surface of the stone, the thicker the surface film; and the softer the stone, the greater the absorption. Numerous experiments have shown that the weight of the average surface film amounts to approximately 1.5 per cent of the weight of the particle of stone, and that the average weight of the absorbed water amounts to approximately 1 per cent. Together the weight of water that can be accounted for in this manner is about 2.5 per cent of the weight of the stone.

Cohesion Water

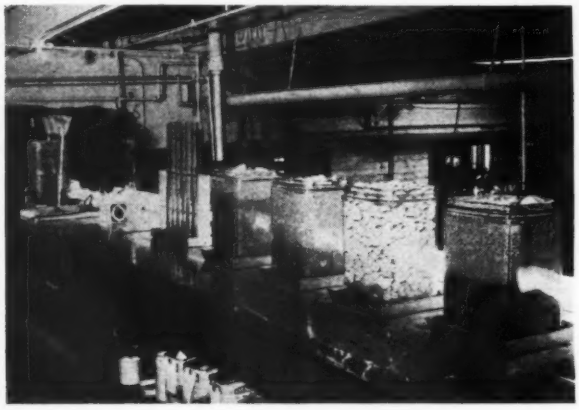
While this is true for a single piece of stone, a further action of water absorption occurs when a large number of pieces are placed together. At all points of contact between neighboring pieces of stone a globule of water forms. We call this "cohesion" water. Naturally, the more points of contact between the adjacent pieces of stone, the greater this amount of cohesion water will be. This water is in addition to the surface film and absorbed water. Tests have shown that ballast made up of all 1½-in. stone will absorb a total of 4.5 per cent of water;

1-in. ballast will absorb 5.5 per cent; and 20 mesh sand will absorb 15 per cent. Ballasts made up of various sizes of stone and sand show higher total absorptions than those in which the sizes are uniform. Some tests have shown water absorption as high as 20 .o 25 per cent by weight.

On this basis it can be shown that a single track ballast section approximately 12 in. under ties will absorb as much as 280 lb. of water per lineal foot, or a 3-in. rainfall, before much water reaches the subgrade, or before any appreciatble amount drains out. If the water does not drain out of the ballast section, then it must disappear by some other means. Fortunately, Mother Nature has supplied the means in the form of capillary action and evaporation. Many experiments over a period of years, and at many localities, have been made by the United States Weather Bureau to determine the rate of surface evaporation. These have shown that, over the entire United States from early spring to late fall, the average rate of evaporation from rough surfaces, similar to that of a railway ballast section, is 0.025 in. of water per hour. Thus, if there were the equivalent of 1 in. of rainfall in the ballast section, it would be evaporated in approximately 40 hr. if the water in the ballast could be brought to the surface. If the sun were shining bright that time would be shortened. Therefore, the problem becomes one of bringing the absorbed water up to the surface, from which it can be evaporated. This upward flow can be effected by using the natural phenomenon of capillary action.



Right — Nordberg Ballast Analyzer Working on Samples of Ballast from Adjacent Tracks



Left—Various Ballasts Are Shown Here Being Tested for Capillarity and Evaporation

Effect of Capillarity

Of the many laws governing capillarity, the ones that effect the water in railway ballast sections most are: (1) Water rises much higher in a small tube or pore than in a large one; (2) water will rise in the small space between two surfaces as well as in a tube; and (3) capillary water will flow in any direction, but always from a wet area to a dry area. Because of these laws it can be shown that in a ballast section having a uniform size of material, the opportunity for the capillary rise of water between the surfaces of the larger sizes is less than it is for the smaller sizes. Furthermore, the rate of upward flow and the height of rise will be less for the larger sizes. It has been determined by the U. S. Department of Soil Conservation that as the sizes of each individual piece of ballast approaches sand, the maximum rise of capillary water is about 3 ft., and the rate of rise is approximately 2 ft. in 24 hr. This means that if such a ballast section is 2 ft. deep and the voids are filled with sand, the water in the bottom of the section can reach the top surface in 24 hr., or faster than it is evaporated under average conditions.

In crushed stone, ballast with open voids there is practically no capillary rise of water. If the voids are filled with mud there is a decided capillary rise, but much of the water so lifted combines with the mud and changes its form into a plastic material. Because of this water absorption by the mud and clay the rate of rise is decreased to such an extent that the top surface dries out and under the vibratory action of traffic it forms a loose powder. The action of this powdery substance is exactly the same as that produced by the "dry" farmer who "mulches" a thin layer of top soil so as to retain the ground water and prevent its evaporation.

Sand Aids Capillarity

When the voids of crushed stone ballast, with the proper gradation of sizes, are filled with good sharp sand (of the proper size), checked experiments prove that all of the water from a 1-in. rainfall in 24 hr. will be absorbed and none will reach the subgrade. For a 2-in. rainfall, less than 10 per cent will reach the subgrade, and for 3 in., less than 20 per cent. All of these figures are based on an average depth of 12 in. of ballast. Under these conditions, the ballast section will raise water better than 3 ft. by capillary action. The evaporation is rapid because the top surface is maintained in a good, large-area evaporation form and vibrations of traffic do not affect it adversely.

To get the best results, it is important to add the right kind of sand. It should be a good grade of sharp sand that will pass through a No. 10 screen and be retained on a No. 50 screen. Finer sands are objectionable because they are sucked up by passing trains and cause dust that permeates into running gear of cars and locomotives.

Many maintenance men have observed the effect of the addition of sand to ballast due to the sand dropped by locomotives. In most cases this manner of sand addition is bad. Why? Most operating specifications for locomotive sands call for approximately 50 per cent of the sand passing through a 50 mesh screen and from 10 to 20 per cent through a 100 mesh

Comparison of Engine Sand Before and After Wheels Roll Over It.

Screen Numbers	Percentages of Sand Retained Between Two Screens As Delivered on Rail	After Being Ground Under Wheels
4 + 8	1.7	0
8 + 10	1.4	1.2
10 + 20	15.8	6.6
20 + 30	16.0	8.5
30 + 40	22.3	13.2
40 + 50	24.9	12.6
50 + 100	15.2	38.6
100 + 200	2.7	8.0
200	0	11.3

(*Continued on page 774*)

Special Car for Crawler Cranes Permits On-Track Operation

Recently-developed carrier now in use on the New Haven is powered by crane engine, permitting travel speeds up to 12 m.p.h. Unit can be mounted in eight minutes

SPECIALLY-designed carrier cars for use with crawler-type cranes are now in operation on the New York, New Haven & Hartford, which permit such cranes to be operated on the track under power supplied by the crane engines. By this means the flexibility of the crawler cranes is considerably enhanced, permitting them to be used either on or off the track as desired. Means for loading and unloading the cranes and for facilitating the removal of the carrying cars from the track are incorporated in the design of the units.

In the new carrying car the frame is of the well type and is suspended between two pairs of flanged wheels, with the wheels at one end being provided with a gear mechanism, including a universal joint, for the transmission of power to the wheels. At the opposite end of the car storage space is provided for loading and unloading ramps and for other necessary tools and equipment.

The car is designed for use with a Koehring Model 205 gas-engine crane of seven tons capacity, equipped with a 30-ft. boom and 5-ft. extension section. When in position on the car the crane is at an angle of 90 deg. with the track, and suitable means are provided for locking it securely in that position. Power is supplied to the travelling mechanism of the car through a pinion on the crane and the universal joint on the car. Any speed up to 12 m.p.h. is available for on-track movement.

The handling of the crane to and from the car is accomplished with the aid of two ramps that are carried as standard equipment. A period of eight minutes is said to be required for setting the car on the track and mounting the crane for on-track work, and a similar period of time for the reverse operation. A suitable lifting bail is provided on the carrying car by means of which it can be handled to and from the track by the crane.

The new crane unit is used for all work for which both on and off-track cranes are adaptable, and is also provided with a 7½-kw., 230-volt, d-c generator for magnet work. Operations performed with the unit include the unloading of rail and other mate-

Handling Timbers with One of the New Crane Units at the New Haven's Timber-Dapping Plant. Above—Mounted on the Carrier Car, the Crane Is Operating as an On-Track Unit. Below—Here the Crane Has Dismounted from the Carrier and Is Operating on the Ground

Showing a Crane Being Loaded on Its Carrier by Means of Special Ramps that Are Carried With it as Standard Equipment

rials, laying rail, ditching, handling timbers on bridge-repair projects, loading scrap, and many others.

The New Haven now has five cranes in operation with these carrying cars, and five additional cranes with cars are on order. The carrying car was designed by the maintenance of way department of the New Haven, working under the general direction of Col. A. L. Bartlett, until recently, engineer, maintenance of way, and now assistant to chief engineer, with the cooperation of engineers of the Koehring Manufacturing Company, Milwaukee, Wis.

Milwaukee Uses Tie-Spacing Template

(*Continued from page 769*)

marking of nine more intermediate lines with the B letter designation (See Fig. III).

The marking of the graduation lines for use with each of the other key letters providing for other variations from the standard length of panel, follows the same system as described, and in each case, the opposite side of the template is similarly treated, so that for each line and letter there is a companion line of the same letter designation exactly opposite. After all lines are marked and lettered, the top surfaces of the template are varnished. Templates made for rail lengths shorter than 39 ft. are marked in the same manner, the only difference being that the distances between forward and rear shoulder ties, for the different variations from normal panel length, are marked for a fewer number of intermediate ties.

In use, the template is worked by two men, who alternate in dragging it ahead to the joints. The first man drags the frame forward until the front end lines up with the center line of the joint. The second man, near the rear end, reads and calls out the key letter of the red line lying closest to the center of the joint staggered in the opposite rail, which, for example, might be the letter S. Each man then chalks a vertical line on the outer side of the rail head under each letter S appearing on his side of the template. If the key letter closest to the center of the joint had been B, then each man would have chalked marks under each of the lines designated B on his side.

In marking the rails, the first man works from the front of the frame toward the rear, while the second man works from the rear toward the front, so that, when the rail on each side has been marked, the men are reversed in position. The second man then picks up the handle and drags the frame to the next joint, while the first man walks along with the rear end of the template and calls out the new key letter for the next panel.

The template is satisfactory for use on curved as well as tangent track because the 2-ft. provision in the key letter markings for lag or gain in normal joint spacing is generally sufficient to compensate for the lag or gain in panel lengths on curves where short, or "dimension", rails have been used to confine the lag or gain to reasonable limits. However, at places where the shorter dimension rails have been laid out-of-face, standard tie spacing cannot be followed and the template cannot be used. The greatest value of the tie-spacing template is in track-raising and surfacing work of considerable magnitude, but it has also been found useful and of value in the construction of new tracks.

Using Sand in Crushed-Stone Ballast

(*Continued from page 772*)

screen. These sands are too fine to begin with, and then most of the sand is placed on the rails and crushed to a very fine powder as the wheels pass over it. It is this fine powdery material that is deleterious to the crushed stone ballast section.

The manner of adding the sand is likewise important. It should never be mixed before ballast application. It shoud be added in the form of a 2-in. layer on the top of the ballast, after the existing ballast has been thoroughly cleaned, or on top of new ballast placed in the track. This layer will work downward under traffic, and when it has disappeared from the top, another layer may be added. In this manner much of the sand will eventually work downward into the subgrade and greatly stabilize and strengthen it.

Additional advantages of adding sand to crushed stone ballast may be listed as follows:

(1) It increases the area of actual contact between the ballast and the tie bottoms, thus decreasing the unit pressure on the wood of the ties.

(2) It locks the stone particles together, and thereby prevents frictional abrasion, so that lower grades of stone may be used satisfactorily.

(3) It permits superior tamping and those "micrometer" raises necessary on high-speed track.

(4) By increasing the number of load points of contact between stone particles, it permits better and more uniform load distribution.

(5) When it becomes necessary to clean the ballast, the sand, in combination with the ballast dirt, is much more easily removed and also makes a good bank-widening material.

(6) It materially decreases weed or vegetable growth in the ballast section.

(7) By reason of increased weight it holds ties in a more stable condition against creeping or side movement.

(8) It permits a harder-tamped track for the same resilience, thereby materially decreasing locomotive pull.

Left—A Typical 12-Tool Tie-Tamping Gang on the Erie, Obtaining Air from a Temporary Pipe Line. Below—Close-Up View of One of the Couplings Used by the Erie in Its Temporary Air Lines

Special Couplings for Erie's Tie-Tamper Air Lines

A considerable amount of track tamping on the Erie is done with pneumatic tampers supplied with air from on-track compressors set off on the shoulder of the roadbed, the air being delivered through temporary pipe lines. An important aspect of this work is the type of coupling that is used for joining the sections of pipe comprising these lines. This article discusses the Erie's tie-tamping practices in general and describes the procedure followed when temporary pipe lines are used, particularly as it is influenced by the type of coupling employed.

IN SURFACING track on the Erie a considerable part of the work is done with pneumatic tampers to which air is delivered through pipe lines from compressors set off on the shoulder of the roadbed. The successful operation of this scheme for delivering air to the tampers depends to a considerable extent on the use of couplings for the air lines that will permit the sections of pipe comprising these lines to be quickly and easily coupled and uncoupled as necessary, while at the same time minimizing loss of air at the joints. On the Erie the couplings used for this purpose, which are all of one type, have now been in use by the railroad for nearly 20 years and are reported to satisfy all of the requirements for couplings in this type of service.

Use of Air Tampers

The tamping work that is done on the Erie with pneumatic tampers is carried out in accordance with this company's regular program of track maintenance in stone-ballast territory. Every year this road's maintenance effort involves large programs of what are known as reballasting and resurfacing, the former including raises of 3 in. to 5 in., and the latter only a light out-of-face raise. In both these types of work, the track is tamped with forks. The year after track is put up by either of these operations, it is retamped with pneumatic tampers, using 12-tool outfits.

Another form of tamping work that is carried out on the Erie with the aid of 12-tool pneumatic outfits consists of what is known as the tie-tamper—cribbing program. This work is performed at locations, usually involving old rail, where out-of-face respacing of the ties is not required and where tie renewals are light. Generally the ballast at these locations is dirty (not muddy) and the track requires smoothing up. These locations are made ready for the tie-tamper operation by first cribbing the track with a power cribbing machine, cleaning the ballast with "moles" and renewing what ties are necessary. Ballast is then unloaded lightly and the track is given a uniform 1½-in. to a 2-in. raise and air tamped.

Some of the 12-tool tamping gangs on the Erie are equipped with crawler compressors, but a considerable number (15 altogether) operate under the scheme in which air is furnished to the tampers through temporary pipe lines. The personnel of each of these gangs consists of a foreman, an assistant foreman and the following organization: One operator in charge of the tie tamper compressor; 12 men operating the tie-tamper guns, 8 on the outside of the rails and 4 on the inside; 2 men operating the jacks; 2 men who keep the cribs properly filled

Portion of a Newly-Laid Air Line for a Tie-Tamping Gang, Showing One of the Couplings Laid Out on a Tie Ready for Application

The First Operation in Applying a Coupling is to Place Lower Portion of the Housing into Position Around the Adjoining Pipe Ends

Air Is Delivered to the Temporary Pipe Lines from 220-cu. ft. Compressors Set Off on the Shoulder of the Roadbed

with ballast ahead of the tampers and handle the hose lines; and 2 track men tightening bolts, driving down spikes and adjusting rail anchors. In addition, where temporary pipe lines are used the organization includes two track men who assist the compressor operator in moving the pipe and perform such other jobs as the foreman may assign to them.

The Pipe Lines

Each of the 15 tamping gangs that utilize on-track compressors, set off on the shoulder, in connection with pipe lines for distributing the air, is equipped with a 220-cu. ft. compressor with a set of transverse wheels to facilitate the work of moving it to and from set-offs along the track. These gangs are each equipped with 2,500 to 3,000 ft. of 2-in. steel pipe, so that the amount of track that can be tamped with one spotting of the compressor ranges between 5,000 ft. and 6,000 ft. Under normal conditions one of these gangs is capable of tamping about 1,000 ft. of track a day.

The 2-in. steel pipe provided for the use of these gangs is furnished in 20-ft. sections, which are fastened permanently into 40-ft. lengths by means of threaded couplings. Formerly the practice was to join the 40-ft. sections with ground joint unions but it was found that the application of these couplings was a relatively slow task, requiring the use of a wrench, and that they frequently developed air leaks.

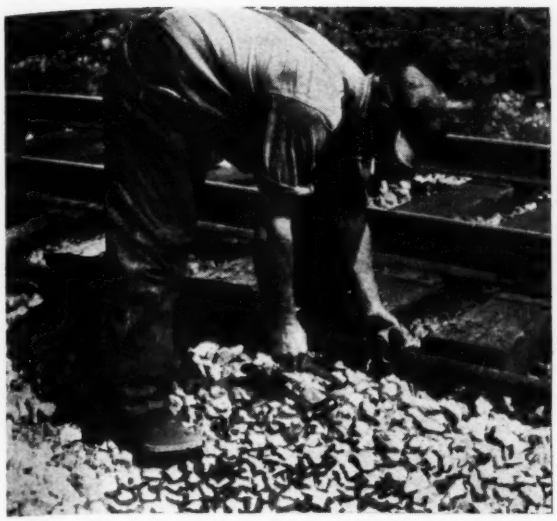
The Coupling Used

Seeking a coupling that could be quickly and easily applied and removed, and which would be air tight, the Erie started in the late Twenties to use what is now known as the Drinkwater Presto-Lock flexible pipe coupling, and soon standardized on the use of this coupling for all tie-tamper gangs using air lines. Each of these couplings consists of three parts, two of which comprise a housing that fits around the ends of the pipe sections being joined, while the third consists of a wedge key. A specially-designed gasket of either neoprene or rubber fits on the inside of each half of the housing. The two parts comprising each housing are so designed, with one of them having two slotted ears or lugs, that the driving of the wedge key into the slots is all that is required to tighten the coupling after it has been placed in position around the pipe ends being joined. Hence, the only tool needed to apply the couplings is a hammer. It is said that these couplings will permit a flexibility of 40 deg. in the sections joined together, while retaining full effectiveness. Recently an experienced operator was timed while he applied one of the couplings, and it was found that only 9 sec. was required from the time the operation was started until the last blow was delivered to the wedge key.

Each of the 12-tool gangs using air lines is supplied with a sufficient number of couplings to permit its entire complement of pipe sections to be coupled up, which is 75 couplings where 3,000 ft. of pipe is provided. In addition, each gang has six to eight extra couplings for use in case of loss or breakage, and a total of 18 to 24 extra gaskets.

Laid in Inter-Track Space

When one of the 12-tool gangs moves forward to a new set-up of the compressor a length of pipe, with a T connection at the end, is extended from the compressor under the nearest track in double-track territory, and



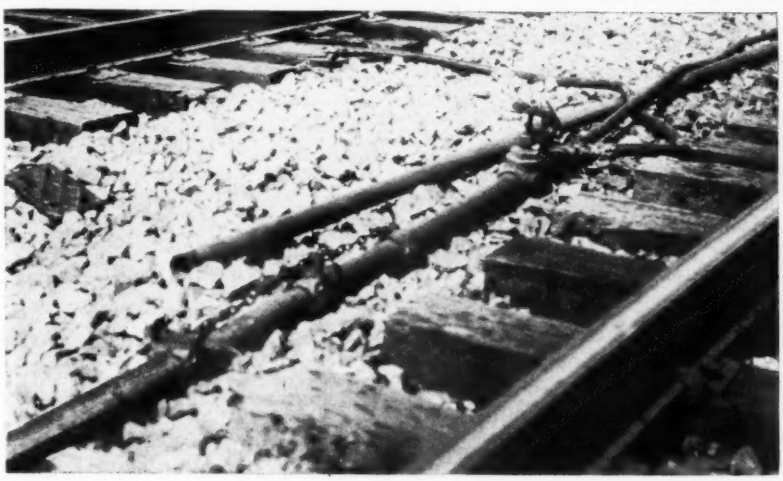
In This View the Upper Portion of the Housing is Being Placed in Position and the Workman has Picked Up the Wedge Key

In the Final Operation the Wedge Key is Inserted Into the Slots in the Coupling and Then Driven Securely into Place with a Hammer

the pipe line is laid in the inter-track space. The full complement of pipe line is then laid back to the point where the work is to begin. Air is taken off the end of the pipe line by means of a short length of pipe containing a gate valve and another valve for bleeding the air from the hose lines when necessary. The short length of pipe at the end of the pipe line is joined to the line by means of a Presto-Lock coupling, and to secure it adequately against longitudinal pressure a length of chain is fastened to the pipe section and extended to an anchorage on the main pipe line. A second gate valve is located about midway of the line when fully extended, which permits the air to be shut off without going clear back to the compressor.

Connected to the end of the pipe line are two lengths of 1-in. rubber hose, one of which is 150 ft. long while the other is 165 ft. in length. The shorter of these is used for supplying air to the tampers working on the near side of the track, while the 165-ft. length is extended under the rails and supplies air to the tampers working on the outer rail. Attached to the end of each hose is a spreader pipe, each of which has three Y connections, accommodating six tampers. When the work has progressed to the limit of reach of the hose lines, the connection to the end of the pipe line is moved forward and another stretch of track is tamped. The amount tamped from each connection at the end of the line is about 300 ft.

When the work is progressing toward the compressor the sections of the pipe line that are no longer needed are moved forward and relaid on the opposite side of the compressor, this work being done as conditions permit



This View Shows How Air Is Taken Off the Pipe Lines. Note How End Section Is Anchored into Place with a Steel Chain

by the operator, assisted by the two men assigned to this task. In moving the pipe sections they are carried on push cars, so that it is necessary for this work to be done between trains.

Inspection of Pipe Line

When the tamping work is in progress the air line is inspected occasionally to detect any possible leaks. In the event a slight leakage is found at a coupling a few taps with a hammer on the wedge key is usually sufficient to correct it. If it should be found necessary to change out a coupling, this is done during a lull in the tamping work, possibly during the lunch hour. When inspecting the air lines the threaded couplings are also checked and a 24-in. and 36-in. pipe wrench is carried for use in tightening these couplings.

At the end of the working season on the Erie each of the compressor outfits is sent to one of the company's maintenance of way work equipment repair shops for overhauling, and while the outfit is in the shop the couplings are checked over carefully and all worn gaskets are renewed. Also, before the outfit is released in the spring the necessary steps are taken to make sure that it is accompanied by a full complement of couplings and extra gaskets.

All tie tamper operations on the Erie are carried out under the general direction of Blair Blowers, chief engineer maintenance of way of the system, Cleveland, Ohio, with H. J. Weccheider, engineer maintenance of way, Youngstown, Ohio, having general charge of the work on the Western district and C. K. Scott, engineer maintenance of way, Jersey City, N. J., exercising general supervision over the work on the Eastern district.

What's the ANSWER?

Locating Joints of New Rail

Where new rail is laid of the same length as that in track, should the locations of the new joints be permitted to coincide with those of the former joints or should they be changed? Why?

Hard to Make the Same

By G. L. Morrison
Assistant Engineer Maintenance of Way and Structures, Southern Pacific, San Francisco, Cal.

Except under certain defined conditions, there seems to be no good reason why an effort should be made to have joints coincide with the location of former joints when rail is being renewed.

In laying new rail, we are confronted with the restrictions imposed by the specifications under which rail is furnished by the mill. These specify, in general, that 11 per cent of the rail furnished may vary in length by 1 ft., between 25 and 38 ft. A ⅜-in. variation in length is also permitted in all rails, and 15 per cent may vary as much as 7/16 in. Because of these allowable variations in length, it would be an almost impossible task to lay rail so that the joints would coincide with old locations.

Usually we find a somewhat adverse ballast condition at joints, and by laying new rail with its joints at other locations a better ballast condition is generally obtained. On railroads where advance preparation is made for new rail laying, and where ties have been spaced correctly to conform to the standards of the road, it may be necessary to do a small amount of additional spacing after the new rail is laid, if the joints do not coincide. However, this will not amount to very much additional work and can be done at the time the track is given its final surface after the rail has been laid.

It is desirable to have joints coincide at signal locations, particularly in centralized traffic control territory. If they do not, considerable expense is involved in relocating and renewing the underground conduit and wiring. Joints can be made to coincide at these locations without much additional work or without wasting much material. This can be done quite easily where the signals are located in the vicinity of switches.

Change Joints if Possible

By W. H. Sparks
General Inspector Track, Chesapeake & Ohio, Russell, Ky.

Being a trackman of the "old school," I was taught by my superiors long ago that all joints, or at least as many as possible outside of those at signals and switches, should be changed when new rail was laid. One might think that today's heavier rail, angle bars, and bolts, larger tie plates, better ballast and the improved methods of maintaining track, might alter the advice of the old timers. However, as I have so often said, the weight of locomotives and cars has increased faster than maintenance practices and materials have improved, so that the situation is about the same as it always was. Consequently, it is just as important now to change the locations of joints as it ever was.

If the new joints are at the same locations as the old ones, they cannot be tamped as solid as would be possible if located at the quarters or centers of the old rail. Even with the best of tamping, the ends of the new rail will show some kink if over the old joint locations.

Of course, at signals, switches and road crossings, it is often necessary to keep the joints at the same points. But even here many changes can be made by installing short rails, resulting in a smoother job.

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in October Issue

1. *How do rails become corrugated? In what way can corrugations be removed effectively? Can they be prevented? If so, how?*

2. *What important changes are being made in the design and construction of sizeable railway buildings because of the continued shortage of some types of materials? Do these present special problems or disadvantages?*

3. *How essential is it that the right of way be kept free of loose track material and miscellaneous scrap? Where essential or desirable, what are the most effective methods to this end?*

4. *What are the best methods of protecting open-deck timber trestles from deck fires? Explain. Does the location of the structure make any difference?*

5. *How can one most effectively and quickly repair a failure in a stretch of continuous welded rail? Does the type or location of failure make any difference? Explain.*

6. *Where water is obtained from a municipal water supply system, how important is it to avoid cross connections at water treating plants? Why? How can this be done?*

7. *What system of anchoring should be used through high-speed turnouts, especially on C.T.C. territory? What factors are involved?*

8. *What are the latest developments in station identification signs? What other modern materials are adaptable for this use?*

Joints Should Be Changed

By C. C. Van Stratten
Roadmaster, Missouri Pacific, Jefferson City, Mo.

The locations of the new joints should be different from the old to obtain the definite advantages which are possible on most roadbeds and in most cases.

New steel is not laid, generally, until that in service has become considerably worn. The rail ends are the parts of the rail that are usually worn more than any other. The pounding effect of traffic rolling over these old battered joints causes the roadbed to become more unstable there than elsewhere. To lay the new joint at the same location is to invite bent angle bars and rail-end batter, unless the laying of the rail can be followed immediately by an out-of-face surfacing.

As this is not always practicable, it is more suitable and economical to lay the new joints where the quarters formerly were, and have the section gang or small track-spotting gang follow closely behind the rail laying to tamp up the ties that were under the old joints. As the quarters of the rail remain in surface better than the joints, this tamping will usually suffice until the complete follow-up work can be accomplished.

Preparing Concrete for Paint

What special preparation, if any, is necessary before painting concrete surfaces, such as floors, walls, columns, etc.? Does it make any difference whether the concrete has been surface-hardened? If so, what?

Preparation Is Important

By Architectural Engineer

The preparation necessary before painting concrete surfaces must be varied slightly for each type of paint that might be used. The selection of which type, and, therefore, the preparation that must be made, depends on several factors: (1) The condition of the concrete; (2) the service to which it will be subjected; and (3) the effect that is desired.

For surfaces that are damp, portland cement paint is ideal, because any surface to which it is applied must first be wetted. Unlike most other paints, this type can be applied to concrete as soon as the forms have been removed. However, there are some advantages in delaying the paint work as long as possible after the concrete has been placed, even when using portland cement paint.

The major preparation for painting concrete is to obtain a clean surface, free from dirt, oil, grease, efflorescence or other paints. If oil was used to keep the forms from sticking, it must be removed. Small amounts can be removed with steel brushes, abrasives, or lye solutions. If the surface is completely oil soaked, a light sand blasting will be effective. Should there be any efflorescence, the surface should be wetted and then scrubbed with a 20 per cent solution of muriatic acid, followed by a thorough rinsing. If the concrete is allowed to remain unpainted for some time after removing the forms, most of the efflorescence will come to the surface early and can be removed before painting. The oil from the forms will also weather off relatively quickly in most cases.

Concrete which has been retained by plywood or similar forms is often so smooth that it is difficult to obtain uniform adherence of the paint. Such surfaces should be acid-washed, sand blasted lightly, or rubbed with stones to roughen them.

The final preparation before the application of the first coat is to spray the surface several times, allowing sufficient time between sprayings so that the moisture may be absorbed by the concrete. This procedure must be repeated a half hour or so after the first wetting, so that the surface will be uniformly damp when the paint is applied. According to the Portland Cement Association,*[1] this type of paint will, if the concrete is carefully prepared for it, not only give many years of service as a decoration, but also act as a waterproofing agent.

If an organic paint is desired as a covering for concrete, the preparation must be a little more complete than for cement paint. In the first place it is imperative that the concrete be well seasoned for 8 to 10 weeks after the moist curing period, and must be perfectly dry when the paint is applied. As before, oil, grease and efflorescence should be removed. Old concrete should be wire brushed to remove dirt and scale.

The major preparation for the application of an organic paint to concrete is the prevention of the saponification of the oils in the paint by giving the concrete a neutralizing wash. Several formulas for this wash are used, but the one that has been recommended most recently by the Bureau of Reclamation*[2] is a solution of 2 per cent zinc chloride and 3 per cent phosphoric acid in water. Generally, it is beneficial to add a bit of pigment to the wash so it can be seen as it is applied, thus preventing the skipping of any area. At least two days should be allowed for the solution to dry. Using other similar solutions, crystals form during the drying. If they do with this new formula, they should be brushed off.

The neutralizing wash should be followed with a primer coat. This can be made by mixing 1 gal. of oil paint, ½ gal. of China wood oil spar varnish, and 1 qt. of a suitable thinner, such as turpentine. When the primer has dried thoroughly any organic paint can be applied.

The painting of concrete floors requires preparation only slightly different than other surfaces. Here, the type of paint to use is the big problem because of the abrasive use the floor gets, etc. Satisfactory results can not be expected if floors are penetrated by moisture from below.

If the concrete floor has been surface hardened, no neutralizing wash is needed to prevent saponification. The main precaution is to get a clean surface to which the paint can adhere. Oil and grease must be removed by solvents. If the surface was smoothly troweled, it probably should be etched by scrubbing with a 10 per cent solution of muriatic acid, then washed with water and dried thoroughly. After that, paint can be applied according to the manufacturer's recommendations.

Methods Can Vary Slightly

By General Bridge and Building Supervisor

To experienced painters, concrete presents no special problem. Each, of course, has his own private short cuts which are satisfactory for his "pet" paint. All of them insist on several precautions to guarantee the quality of their work. The most important of these is undoubtedly the insistence that the surface be as dry as it is possible to get it. Many want several days or a week of clear, dry weather prior to painting concrete. Some even take the humidity into consideration, waiting until it drops before they will start. Others refuse to start until late in the morning or to paint too late in the evening to avoid the danger of moisture.

All agree that newly-placed concrete

*[1]Bulletin No. ST-1 of this association covers the Painting of Concrete in complete detail.

*[2]In a report by G. E. Burnett and A. L. Fowler in the June, 1947, issue of the American Concrete Institute.

should be allowed to age before painting, but each will vary his advice as to how long. The average length of time they consider satisfactory is about six months. Each will admit that greener concrete can be satisfactorily painted if neutralized to prevent saponification. However, here again each has his own formula for accomplishing the result he desires. One says to use two pounds of zinc sulphate in a gallon of water; another uses ordinary carbonic acid water; still another wants to use two pounds of magnesium fluosilicate per gallon. All vary as to how long they require these preparations to dry; some say 48 hrs., others just say to wait until it dries, even if it takes a week.

If concrete floors are to be painted, the same general precautionary measures must be taken. However, if the floor has been surface hardened, few painters do more than to assure themselves that no heavy coating of water glass (sodium silicate) remains. If it does, they remove it by one means or another. If the floor hasn't been treated with a hardening agent they generally require a double strength neutralizing treatment.

Finally, each painter will demand to use his favorite paint or refuse to take any responsibility for the result, regardless of what preparation has been given. During and since the war, because of the short supply of good paint, the exponents of oil paints have shied from concrete work, and have left the field to the men recommending portland cement paint, which is gaining favor for most surfaces except floors.

This type of paint requires preparation similar to others, except that the surface not only doesn't have to be dry, but must be wet when the paint is applied. Of course, its champions say, no neutralizer is required to prevent saponification. However, they do like to use a muriatic acid solution to remove efflorescence.

All in all, in my opinion, the best preparation that can be made to paint concrete surfaces is to turn the job over to an experienced paint foreman who has done this type of work before and gotten good results. Generally, such men, while having favorite ways of doing their work, are also amenable to suggestions as to how their task can be made easier. Consequently, new ideas, such as new neutralizing agents which might have been tested and recommended by government agencies, etc., when passed on to such men are appreciated and will be used when opportunity affords.

Culverts Carrying Acid Water

What type of culvert should be used where it must carry acid refuse water from industries? How can existing concrete culverts be repaired effectively if damaged by such water?

Lining Resists Corrosion

By Duke Nathan
Chief Engineer, Hamilton Kent Manufacturing Company, Kent, Ohio

Because of the general conditions of service, including the need of using many sizes and of resisting various loads, we believe that reinforced concrete is the ideal material to use in the manufacture of culverts. However, as in the case of many other products, it is imperative that certain precautions be taken in its use if maximum effectiveness is to be attained. If concrete pipe culverts are to be used under railroad tracks, the sections of pipe should be sealed with a leak-proof rubber joint. If they must carry industrial refuse water, they should be given an acid-proof, corrosion-resistant lining.

A rubber joint provides a tight, leak-proof coupling. It eliminates the infiltration of ground water or silt, preventing line-clogging or disturbance of the backfill. The rubber will absorb the expansion, contraction, soil stress and vibration to which most culverts under railroads are continually subjected. Rubber has proved to be an effective sealing medium, as is evidenced by the fact that in this country alone there are about 200,000 mi. of rubber-coupled pipe lines operating successfully in almost every possible type of service.

A synthetic hard rubber lining will provide the desired protection against acids or corrosion. Such a lining has the following physical characteristics which are, to my mind, important to satisfactory culvert service: (1) It is unaffected by practically all industrial acids and alkalies, by mineral or organic oils, or by any of their lighter fractions; (2) it is not a paint or cement film—it becomes an integral part of the pipe, penetrating concrete or other semi-porous surface quickly and deeply; (3) it gives a pipe surface a low coefficient of friction; (4) it resists abrasion; and (5) it does not oxidize.

To repair existing culverts which may have been damaged by corrosion, a synthetic, hard-rubber lining can be applied by using a portable air compressor and spray gun. In using this method, care must be taken to have the concrete surface dry and free from silt or other foreign matter, so that the rubber will adhere to the concrete.

Problem Not Yet Solved

By Assistant Engineer Maintenance of Way and Structures

The flow of acid industrial refuse water through culverts, where such is necessary, presents a serious problem since such water is actively corrosive to both concrete and corrugated metal. Considered purely from the standpoint of resistance to corrosion, a vitrified pipe would be the most effective. Unfortunately, however, this type of pipe is more vulnerable to load and impact stresses than other pipes. Cast iron pipe, which is strong enough to withstand the shock of heavy traffic, is also resistant to the corrosion of most industrial waste water. It is quite expensive however, and still hard to obtain.

Where concrete pipe had been installed originally to carry non-corrosive water to which subsequent industrial expansion had added enough caustic elements to attack the concrete, successful repairs, it is said, have been made by patching with either a rich cement or asphaltic concrete mix. Before applying this patching, the invert should be carefully cleaned of all acid water. If the corrosion has exposed the reinforcing, it too should be thoroughly cleaned or a good bond will not be developed.

Although I have never heard of its ever having been done, I believe that a coating of acid-proof cement, such as steel mills use to coat their brick-lined pickling tanks, could be used to coat concrete pipe to make it corrosion resistant. This is a sodium silicate cement, which is chemical-setting and quick hardening. Its first installation in this country was as a mortar for laying acid-proof brick and is said to have resisted sulphuric acid for 14 years. If this cement could be made to bind to concrete pipe, corrosive attacks of industrial acids would be minimized.

In recent years, a specially prepared asphaltic pavement has been developed for use with corrugated metal pipe. This has proved effective in handling a large number of severely corrosive liquids, including industrial wastes having alkali concentrations. However, the problem of carrying industrial refuse water and other corrosive liquids under railroad tracks has not yet been solved to the complete satisfaction of either the railroads or industries. Many special installations were made during the war which may or may not stand the test of long service. If they do, a big start will have been made toward providing a safe, economical and adequate culvert pipe that will resist the corrosive elements frequently encountered.

Manganese Guard Rails

What is the maximum length desirable for manganese, one-piece guard rails? Why? What is the maximum practicable length? Why?

Thickness Controls Length

By Wm. G. Halbert

Vice-President, Engineering & Development, Taylor-Wharton Iron & Steel Co., Easton, Pa.

In our opinion, the maximum length desirable for manganese one-piece guard rails should be determined principally from an operating viewpoint. The railroads, as users, should determine the necessary length of guarding face to cover all existing conditions. Beyond the length of guarding face, economy will dictate the maximum length desirable.

These factors were well considered by representatives of the railroads and manufacturers in arriving at the data now included on A.R.E.A. Plan No. 510-40, which covers guard rails for use with frogs from No. 4 to No. 20.

We do not know what the maximum practicable length would be. In our opinion, this length would be governed by the thickness of the metal sections used. We have made one-piece manganese steel guard rails 10 ft. 3 in. long without difficulty, and we feel sure that we could make them much longer, should they be required. However, at some length of casting it would be necessary to increase the thickness of the metal sections in order that the metal would flow to all parts of the mold and completely fill out all sections before chilling.

Length Limited By Cost

By Division Engineer

The longest one-piece manganese guard rail that is desirable is the one which will give adequate protection to the longest frog in general use in heavy service territory, and which can be manufactured economically. On the turnout side of No. 20 frogs, experience has shown that at least 3 ft. of the straight portion of the guarding face should be ahead of the frog point to provide the protection desired. From this minimum, which will require a guard rail of more than 9 ft., it is doubtful if the desirability should stop short of the 15 or 16 ft. required for the inside of a sharp curve. The wear resistance of manganese steel, coupled with the simplicity of the one-piece guard rail, would certainly indicate such a desirability.

However, economics and practicability assert themselves at some unknown point between our minimum length of 9 ft. and our needed 16 ft. It is conceivable that the foundry problems of casting long guard rails might raise the cost beyond reach. As the length is increased, the body portions of the guard rail would, no doubt, have to be thickened to maintain a practical "slenderness ratio." This might easily become the controlling factor in limiting the practicable length.

Warpage results when a one-piece manganese guard rail is cast and heat treated. Consequently all castings of this type have to be straightened before being offered for use. No doubt, increased length causes more warpage, which greatly raises the cost of straightening. One manganese steel foundry has consistently refused to cast manganese guard rails 10 ft. long on the plea that the cost of straightening would be more than the customer would be willing to pay. On the other hand, satisfactory one-piece manganese guard rails 10 ft. long have been furnished by other foundries. Perhaps even longer ones could be produced if economic justification for them could be found. Should labor cost continue to rise, the expense of installing the tee guard rail might justify the cost of a longer one-piece manganese guard rail.

Damage to Asphalt Paving

How serious is the deterioration of asphalt paving at freighthouses, passenger stations, and other buildings, due to drippings of oil and gasoline from automotive equipment? How can this deterioration be prevented?

Damage Can Be Prevented

By John McCulloch

Representative, Maintenance, Incorporated, Wooster, Ohio

To understand the problem of the deterioration of asphalt pavements due to the drippings of gasoline and oil, it is important to know the process by which asphalt is derived. Asphalt, gasoline, and oil are chemical components of crude petroleum. During the refining process of the latter, they are separated. Gasoline and oil are extracted from the crude oil, while asphalt is one of the residues.

When gasoline or oil again comes in contact with asphalt, they have an affinity for one another, and tend to return to their original state—crude oil. As a result of this physical reaction the asphalt softens and flows.

Equally as serious as the damage caused by gasoline and oil drippings, is the damage caused by the actinic rays of the sun and the subsequent penetration of surface moisture, causing frost action. Asphalts are open-chain hydrocarbons and, therefore, are vulnerable to attack by these actinic rays. It has been observed that these short-wave light-rays penetrate asphalts, inducing oxidation. In a short time, this permits the infiltration of surface moisture. The freezing and thawing of this moisture during rapid temperature changes will cause the pavement to break up. These facts indicate that the durability of an asphalt pavement varies in direct relation to the protection given its surface.

A liquid especially designed to provide complete protection from such damaging factors has been used so effectively by the oil industry for many years, that practically all of the major oil companies now treat their gasoline stations and parking lot pavements with it. The Army and Navy are using it to protect airfield pavements.

This liquid is an irreversible emulsion, formulated by an intricate manu-

facturing process so as to retain all of the valuable protective and resistant qualities of coal tar pitch. However, unlike all other forms of this product, it has no flow-point at any temperature.

It is prepared with a heavy, closed-ring hydrocarbon base, which not only makes it insoluble in open-chain petroleum products, from gasoline to fuel oil, but also makes it impervious to short-wave light rays. A film made from it can be exposed to direct sunlight for long periods of time and then immersed for equal periods in water with no apparent effect. When the water in which the hydrocarbon base is dispersed has evaporated, the product becomes completely insoluble in water.

This type of protective treatment is easily and inexpensively applied. In most cases, squeegee application is best for asphalt pavements. However, it can be effectively brushed or sprayed on the asphalt. Where very large areas are involved, distributor truck application can be made.

Knows of No Preventive

By Assistant to Engineer of Buildings

We have, of course, experienced deterioration in our asphalt and bituminous paving at freighthouses, passenger stations, and other buildings, but have attributed this to ordinary mechanical wear. It is possible that some of the deterioration could have been due to oil and gasoline drippings, and that wear and tear was hastened more than it might have been if the pavement were not subjected to these conditions.

The measure of such deterioration would, however, be difficult to determine; and if there is a preventive, we have had no experience with it.

Damage Not Condemning

By G. V. Coffey
Supervisor Bridges and Buildings, New York Central, Jackson, Mich.

It is true that considerable trouble is experienced with asphalt paving where automotive equipment is parked over it most of the time. The oil and gasoline drippings from such equipment tend to dissolve the asphalt binder from the aggregate of the paving, leaving holes and rough spots. The effects, continuing for several months, often result in the complete demolishing of the paving.

There are so many advantageous features of asphalt paving that I do not believe its deterioration, in the comparatively small areas where drippings are excessive, would condemn its extensive use. The material is ideal and economical to install. It is more resistant to salt and other snow and ice melting agents than other types of pavements. This makes its use desirable in territories where snow is a problem. Asphalt paving seems to iron itself out under rolling pneumatic tires to even contours rather than to develop abrupt and deep "chuck-holes," as some types of pavement do. Last, but not least, it can be quickly repaired at a very minor cost by regular maintenance forces.

There are several top dressings and admixtures for use with asphalt mixtures that tend to render them more or less impervious to oils, greases, and other hydrocarbons, but they are not yet perfect. It has been found that a heavy sprinkling of portland cement, rolled into the surface of the pavement when it is being applied, forms a very good protective surface.

Observing Safety Violations

What is the best method of calling a man's attention to the fact that he has violated a safety rule? Are disciplinary measures effective? If so, how can they best be administered?

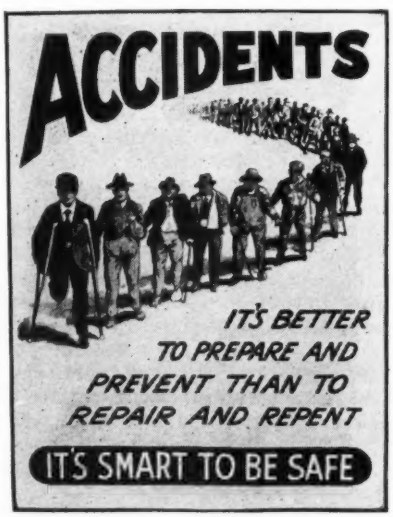
Don't Embarrass Violator

By W. E. Ross*
Division Engineer, Chicago, Milwaukee, St. Paul & Pacific, Spokane, Wash.

Practically all the ways in which men can be injured or killed, and property damaged or destroyed, are known, and have been incorporated in safety rule books. These books are in the hands of the foremen, and a safety rule is read to the men each day. These rule books are the result of past experience, and new rules are added from time to time as new ways in which injuries can occur are developed. By the observance of these rules in the course of performing his work, and by the exercise of the ordinary common-sense rules for survival, a man can do his work without being killed or injured, or without damaging or destroying property. It devolves, therefore, upon his supervisor and foreman to devise a program of instruction and training that will assure the observance of the safety rules, and the exercise of common sense. They must administer such a program, and put it across to the man in such a way that he will work in a safe manner.

Promptness in calling a man's attention to a violation of a safety rule immediately after the occurrence is considered to be of the greatest importance. This point is stressed in instructions to all foremen, and is practiced by all supervisors. By thus promptly calling a man's attention to his violation, the impression remains firmly with him. At that time an explanation is given to him of exactly how he violated the rule. He is told that the rule was put in the Safety Rule Book as a result of much past experience; that the rule is in effect to protect him and his family from loss of life, injuries, and loss of wages. A demonstration, if practicable, is given, showing just what would have occurred had he continued in his violation. Thus, the idea of doing his work in a safe manner is imprinted in his mind. It is a lesson that he will not forget. Furthermore, calling the violation to his attention and the subsequent demonstration have a favorable effect on the other members of his crew or any gang working in that vicinity. It is an object lesson for them.

In advising a man that he has violated a rule, an attempt is made to impress the incident firmly in his mind.



This Poster, No. 287, Constitutes the August Installment of the "All the Year—Every Year Safety Program" of the Safety Section, Association of American Railroads

*The maintenance forces under the supervision of Mr. Ross had no reportable personal injuries during 1946 and contributed greatly toward the Idaho division's winning of the Milwaukee's system Safety Trophy.

and yet, not unduly enbarrass him in the presence of his fellow workmen. It is felt that if a feeling of resentment on the part of the man can be avoided, and still the proper and safe method of doing the work be left with him, he will observe the safety rules and safe working practices better at all times.

I do not believe that disciplinary action should be taken except for extreme violations which involve loss of life, exceptionally severe personal injuries, or the damage or destruction of considerable property. I believe, instead, that the program mentioned above is more effective in producing a good safety record.

Handle Like Other Errors

By H. R. Hoyle
Safety Engineer, Dow Chemical Company, Midland, Mich.

When safety is considered as an integral part of good operation, along with quantity and quality of production, the foreman's objective will be to develop a thinking employee who thoroughly understands his job, including its hazards and their elimination.

Under this philosophy of accident prevention, the foreman will handle the infraction of a safety rule the same as he would any other error the man might make in doing his work. Usually, this will involve pointing out the error, explaining the right method, and giving the reasons why the one method is better than the other. When penalties become necessary, they should be determined by the circumstances involved in each case.

Best to Avoid Discipline

By C. R. Young
Director of Personnel, Illinois Central*, Chicago

The best method of calling a man's attention to the fact that he has violated a safety rule is to take him aside and explain the reason for the rule and show him wherein he has violated it. Disciplinary measures are effective when necessary, and when properly applied. However, if the employee has been properly taught, it will not be necessary to resort to discipline. Discipline assessed without proper explanation engenders resentment instead of cooperation.

The best method of administering discipline is to avoid it where possible. Discipline is education rather than punishment. When an employee becomes safety conscious, and understands the reason for safety rules, he will not be hurt wilfully. Education is generally achieved by precept and example. Discipline cannot be had among employees unless the supervisor has self-discipline. As an illustration, it might be said that the best way to prevail upon employees to wear safety shoes is to persuade the foreman and supervisors to set the example and demonstrate the effectiveness of such shoes.

*The Illinois Central was awarded top honors by the National Safety Council in the 1946 Railroad Employee's National Safety Contest for Class I railroads whose employees worked 50,000,000 or more man-hours.

Delivering Water to Diesels

Where quick-acting valves are necessary at Diesel watering points, how can the damaging effect of water hammer be best overcome?

Vary Valve Closing Speed

By Gilbert F. Behrend
District Manager, Clayton Manufacturing Company, Chicago

The problem of surge or line hammer commonly encountered when using a quick-closing valve on a high pressure line can be overcome best by the use of a valve which, when closing, automatically slows down from a fast start, eases the disc to its seat, and thereby dissipates the surge before the valve is fully closed. Such a valve is presently being used to good advantage in railroad yards on a variety of jobs, a typical application being its use on high-pressure Diesel fuel lines where it closes quickly, yet prevents line hammer due to its hydraulic-balance principle of control.

This valve is of a modified globe design, employing a diaphragm as the operating means. When called upon to close, line pressure is directed into the cover of the valve above the diaphragm. The diaphragm, stem and disc are connected in a single assembly, so that movement of the diaphragm opens or closes the valve. The effective area of the diaphragm is greater than the seat opening, so that ample force is applied to close the valve drip tight.

The control which determines the speed of valve operations may be compared with a hydraulic door closer, because it consists of a plunger and a housing. When the valve starts to close, the plunger is completely clear of the ports in the housing, so that line pressure, used for closing, is only slightly impeded. Thus, there is a tendency for the valve to close quickly. However, as the plunger is pulled downward by the valve stem, it gradually blocks the ports, so that the flow is effectively throttled before the valve closes. As the valve continues its travel, the amount of fluid used for final closure is determined by the clearance between the plunger and the wall of the housing through which it passes. Consequently, the final action is extremely smooth and quiet. The speed can be adjusted easily by a nut, which raises the plunger to increase the closing, and lowers it to decrease the speed of operation.

The utilization of line pressure to open and close the main valve is made possible by a small pilot valve containing two ports. One port admits the line pressure to the hydraulic chamber to close the valve; the other drains the hydraulic chamber to the discharge side of the valve, causing it to open. Only a very small amount of liquid is required for each pilot valve operation, allowing the use of a small disc with a minimum of frictional surface. The pilot valve may be actuated manually, electrically, hydraulically, or by means of a float.

Uses Plug Valves

By W. D. Gibson
Assistant Engineer, Chicago, Burlington & Quincy, Chicago

When we were first called upon to design plants for the quick delivery of Diesel boiler water to multiple outlets, we considered that there might possibly be some difficulty experienced from water hammer if the conventional type of quick-closing gate valves were used. Consideration was given to the correct procedure to prevent such trouble, and it was decided to use 500-gal. per min., low-head, centrifugal pumps and 6-in. steel delivery pipe lines to the various 2½-in. outlets.

The reason for the decision to use the high-capacity, low-head pumps with the comparatively large pipe lines was to reduce the velocity and pressure of the water in the pipe, with the assumption that the possibility of water hammer would be correspondingly reduced.

We were of the opinion that plug valves, requiring a turn of only 90 deg. to fully open or close, would help to reduce the possibility of water

hammer. Consequently, a 2½-in. lubricated-type of this valve was used. The results were excellent, and little if any difficulty has been reported from that source. It was decided that if water hammer did occur to the extent that damage to the pipe lines or equipment resulted, we would install an air chamber directly ahead of the pump discharge. This air chamber would have been constructed of 6-in. pipe and provided with an air connection and automatic drain to insure maintenance of air pressure in the chamber. This type of air chamber has been found effective under other circumstances where water hammer has occurred.

Effect of Saturated Roadbeds

What are the disadvantages of undrained borrow pits or side ditches? Does it make any difference whether the saturation of the roadbed is uniform and permanent or not? Does the character of the material in the roadbed make any difference?

Drain All Borrow Pits

By W. H. Sparks
General Inspector Track, Chesapeake & Ohio, Russell, Ky.

Undrained borrow pits have many disadvantages. Wherever water stands along the right of way there will almost always be muskrats. These animals will burrow into the railroad embankment and form weak spots which will cause uneven line and surface to develop. Water standing along fills will often soften the sides and cause them to separate from the more solid portion of the roadbed and slide into the water. This softening and sliding will cause uneven track surface even before the whole side of the fill slips.

Where water stands along the track, either in a creek, a river, or a pit, it should be drained away, even if it costs a lot of money, because such places will always be a hardship on trackmen during all seasons of the year. Water standing close to the tracks has been one of the railroads biggest enemies.

The character of the material forming the roadbed makes a great deal of difference on the effect such water has on the tracks. If the roadbed material is made of soft, mucky substances, the water will not drain from it and trouble will soon start. If the roadbed is made of sandy soil, the water will drain away freely and the trouble which is characteristic of many other types of soils will hardly be noticeable.

As locomotives have become larger and heavier, and cars have gotten longer, higher, and are loaded fuller, many places along the track, where water was near the roadbed, have given more trouble than they did before. These heavier loads moving over the rail are sure to form a wave motion which will start water pockets, and sometimes slides. Consequently, borrow pits and all other points where water stands along the tracks should be drained in order to avoid danger from the source.

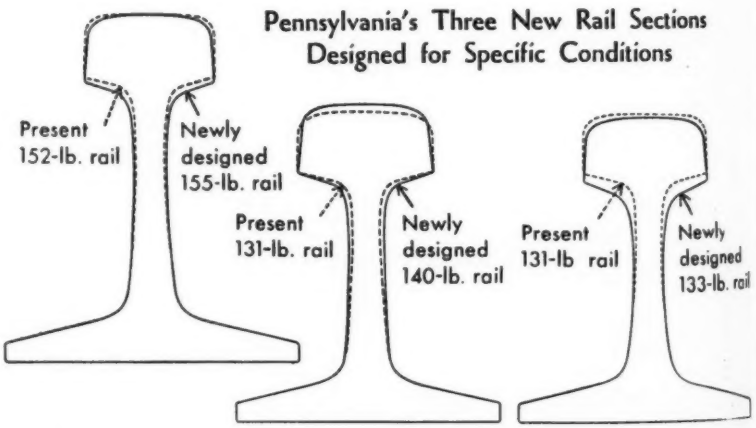
Degree of Harm Varies

By R. W. Willis
Assistant Chief Engineer, Chicago, Burlington & Quincy, Chicago

Undrained borrow pits may or may not increase the maintenance of track depending on several conditions. One of the most important of these is the kind of material both in the roadbed and between it and the borrow pit. If the pit is in sandy material, and the track embankment is made of sand, the effect of draining the pit would be negative under ordinary conditions. There are many miles of railroad embankments in this country made of sand with water against them, that are very stable.

However, if the borrow pit is adjacent to the track and the material is that which is usually encountered along railroads, it is very important that it be drained. The clays and loams usually used for railroad embankments take up water in various degrees, either by absorption or capillary attraction. Undrained borrow pits adjacent to the track thus cause the material between the embankment and the borrow pit to absorb more or less water. If it absorbs enough water to make it soft, the pressure and vibration of the embankment may cause the embankment to slip downward. Such slides often cause slow orders or discontinuance of train service until they can be repaired.

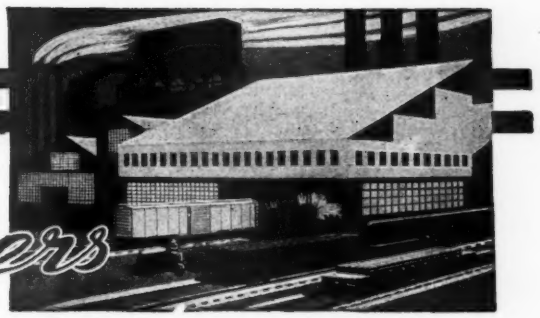
If the embankment is low, the material in it may absorb seepage water from pits or side ditches, and become soft. This makes it very difficult to maintain good track line and surface. If the borrow pit is far enough from the track, the stability of the roadbed will be unaffected by water in the pit, regardless of the type of material in the embankment or between it and the borrow pit.


Pennsylvania's Three New Rail Sections Designed for Specific Conditions
Present 152-lb. rail
Newly designed 155-lb. rail
Present 131-lb. rail
Newly designed 140-lb. rail
Present 131-lb rail
Newly designed 133-lb. rail

***THREE** new rail sections that are now in use on the Pennsylvania are illustrated by these sketches, which also have dashed lines to show how the new sections differ from those replaced. Adopted after several years of research, development and experimentation, each of these three types is said to be designed to meet a specific operating condition. The new 155-lb. section (left) is intended for use in track carrying the heaviest traffic, and replaces the company's present 152-lb. section. The additional steel in this section, together with the new design of the rail head and the web, are said to make it the strongest that has ever been devised.*

The new 140-lb. section, shown in the center, has been developed for use in track which does not have sufficient tonnage or traffic density to require the heaviest rail. Compared with 131-lb. rail, the new section has a thicker head, a thicker web, and is somewhat higher. The third new rail design, weighing 133 lb. per yard, while only slightly heavier than the 131-lb. section, has a thicker head and a newly-designed web, which are expected to promote longer life and better service. The 133-lb. section has also been adopted by the American Railway Engineering Association.

PRODUCTS of Manufacturers



(For additional information on any of the products described in these columns, use postcards, page 741)

Fire-Retardant Coating Material

THE development of a new fire-retardant coating material, known as Albi—"R," said to be highly effective in reducing fire hazards, has been announced by the Albi Chemical Corporation, New York. Shipped in powder form to be mixed with water, Albi—"R" is applied like a paint and is said to dry to a white, smooth, hard, flat surface which will not dust or peel. If desired, it can be tinted by the addition of dry colors or water-soluble dyes.

This product is intended for use on all interior combustible surfaces and is reported as having excellent qualities of adherence regardless of whether the surface is painted or unpainted. Further, it is claimed, it can be used as an undercoat for oil paints, enamel or lacquer, a practice that is recommended for locations where excessive moisture prevails or where washing is necessary. As an interior finish, Albi—"R" is reported to be as resistant to interior exposures as cold-water paint. In accelerated interior exposure tests, conducted at Purdue University, equal to approximately 12 years of normal exposure, Albi—"R" was said to be unaffected in appearance, bonding or fire-retardant qualities.

When surfaces coated with this material are exposed to flames, small blisters form at the point of greatest heat, gradually spreading as the temperature increases. This formation is said to develop into a cellular mat, the thickness of which increases in proportion to the intensity of heat and the thickness of the original coating of Albi—"R". The effect of the blisters is to place a blanket of incombustible material between the flame and the surface underneath the coating.

In "20-min. burning" tests of Federal Specification SS-A-118 on interior plywood and several types of fiber insulation board, coverages of 140 to 200 sq. ft. per gal. were said to meet the requirements of the "slow-burning" classification. Thoroughly tested by Underwriters Laboratories, Inc., Albi—"R" was found to be effective in reducing the flame spread on woods between 50 and 70 per cent as compared to uncoated lumber, without adding to the toxicity of such gases as are released by untreated wood when exposed to fire.

New Tournapull

ANOTHER model in its line of high-speed, electric-controlled earth-moving equipment—the Model B Tournapull, having a capacity of 35 tons—has been announced by R. G. LeTourneau, Inc., Peoria, Ill. Powered by a 225-hp. Diesel engine, the new unit is available for use with two sizes of scrapers—the new E-35 Carryall having a capacity of 35 tons (26. 1 cu. yd., struck), or the 25-ton E-25 Carryall (16.5 cu. yd., struck). With the E-35 Carryall the overall specifications of the unit are: Length 37 ft. 6 in.; height 11 ft. 3 in.; width 11 ft. 7 in.; wheelbase 23 ft. 8½ in.; minimum turning radius 33 ft.; and empty weight 20½ tons. It can make a 90-deg. turn in either direction.

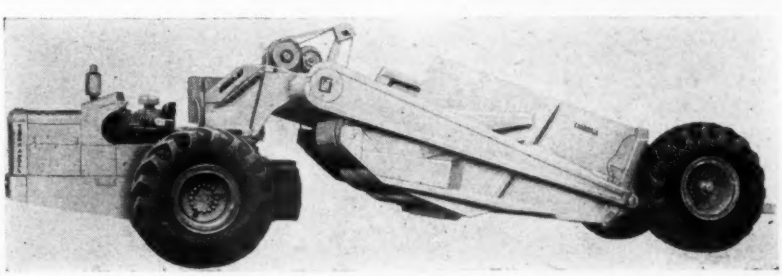
The new developments in the design of the Tournapull include electric control, Tournamatic constant-mesh transmission and Tournamatic differential. The Tournapull steering, and the Carryall bowl, apron and tailgate are all controlled by individual electric motors, replacing conventional steering principles and eliminating the need of a power-control unit for operating the scraper. The electric motors are of a new alternating current type with the lugging characteristics of the direct-current type, and are specifically designed and built for use in connection with heavy construction work. These electrically-operated controls are said to give all Tournapull and scraper operation finger-tip control by means of push buttons.

The new Tournamatic constant-mesh transmission eliminates the foot clutch and permits changes of gear by moving one lever, which is said to give non-stop instantaneous speed selection. The unit has four speeds forward and two in reverse and travels at speeds up to 15 m.p.h.

A newly-designed torque-proportioning differential is said automatically to supply the most power to the drive wheel having the firmest footing, which action is said to give positive control, greater traction, and to eliminate the spinning of any wheel independently of the other.

Both the Model B Tournapull and the Carryall are mounted on 24.00 by 29 tapered-bead tires. The tapered-bead tire is said to seat itself firmly against the wheel rim at low air pressure, which action is reported to give greater traction and longer life.

The new Tournapull is designed specially for high production with high speed and maneuverability, and is said to be particularly adaptable for big-yardage jobs such as roadway construction, or those involving heavy stripping. Based on good working conditions, negligible grades, level



The Model B Tournapull with the E-35 Scraper

cuts, efficient management and a 60-min.-per-hr. operating efficiency, the Model B Tournapull with the E-35 Carryall is said to be capable of producing 347 cu. yd. of earth per hour on a 500-ft. one-way haul, 244 yd. on a 1500-ft. haul, 129 yd. on a 5,000-ft. haul, and 69 yd. on a 10,000-ft. haul.

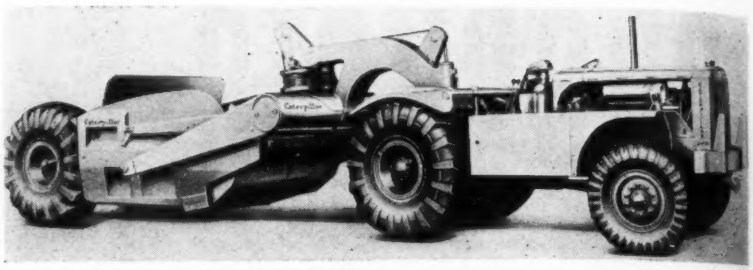
Lettering Machine

THE Underwood Corporation, New York, has developed a machine for lettering drawings, plans, charts and other forms prepared in engineering offices. Known as the Elliott Fisher Electric Lettering machine, this device embodies a lettering head in the form of a carriage traveling on a supporting mechanism that in turn is mounted on two bars, transverse of the carriage. These bars serve also as a track for movements of the machine at right angles to the operator. Directly beneath the bars is a flat platen or writing surface, 16½ by 24 in. in size, with a roll in front and one behind for holding the work. The machine is mounted on a stand similar to a desk.

The lettering head contains a standard keyboard, with the key strokes electrically operated, and moves automatically on its guides for letter spacing. Line spacing is either automatic with the return of the lettering head or manual by means of a rifle-sight line indicator, which tells the operator at all times where the type will print. The writing area contains approximately 396 sq. in. at one setting.

The advantages claimed for the lettering machine are as follows: Mechanical precision at typing speed; sharp and clear type impressions due to the electrically controlled stroke; the flat writing surface which is visible to the operator at all times; pin-point accuracy due to the specially-designed line indicator; and the availability of characters to suit the needs of the user. Also, the standard keyboard is said to permit an office clerk to become a proficient operator quickly.

The Elliott Fisher Electric Lettering Machine



The New Caterpillar Earth-Moving Team, Including the DW-10 Tractor, the No. 10 Scraper and the No. 21 Cable-Control Unit

Scraper Unit With Wheel-Type Tractor

THE Caterpillar Tractor Company, Peoria, Ill., has added a new earth-moving team, composed of a new DW-10 diesel wheel-type tractor, a new No. 10 scraper, and a new No. 21 cable-control unit, to its present line of earth-moving equipment. These new units are said to be matched in design for maximum efficiency of operation and working ability.

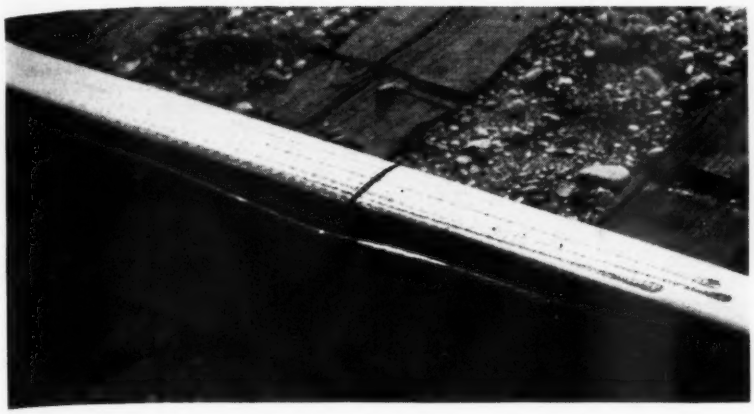
The principal advantages of the new DW-10 tractor over the predecessor model, according to the manufacturer, include a 15-per cent increase in power output through the application of a new six-cylinder Diesel engine; an improved double-plate clutch with semi-metallic facing, equipped with heavy springs to withstand shock and provide smoother operation; a constant-mesh transmission with helical gears in all but low and reverse, providing five forward speeds; self-adjusting clutch brake to facilitate gear shifting; pressure lubrication to roller bearings on all driven gears from a gear-type pump; spiral bevel gears for quiet operation at hauling speeds; full floating rear axle with weight carried on axle housing; individual spur-type final drive gears to each driving wheel, for added strength; steering aided by a shockless, worm and ball-nut type control integral with hydraulic booster; heavy-duty, air-actuated, mechanically-operated brakes with 18-in. drum and 7-in. shoes universal yoke-type draft connection with trailer unit for better stability; and oscillating front axle for smoother riding.

The hydraulic pressure is supplied to the steering booster by a front-mounted pump, which is of adequate size to handle the pressure requirements for raising doors when the tractor is used with a Caterpillar W-10 wagon. Top speed of the unit with loaded wagon and scraper is 18.8 m.p.h. with standard transmission, and 21.6 to 24.5 m.p.h. with optional transmissions when equipped with 21.00 by 25 tires. Tires of 18.00 by 25 may also be used, which result in speeds of 17.6, 20.2 or 22.9 m.p.h., respectively. The tractor develops a power output of 115 hp. at 1800 r.p.m.

The new No. 10 scraper, which is designed exclusively for use with the tractor, has a heaped capacity of 11 cu. yd.; is of the open-bowl design for greater stability, visibility and access for shovel and dragline loading; has a high apron lift for ease of material clearance; has positive, forward ejection; and has precision-grooved sheaves and self-sharpening cutting edges.

The new No. 21 rear-mounted double-drum cable control is also matched to the requirements of the

(For additional information on any of the products described on this page, use postcards, page 741)



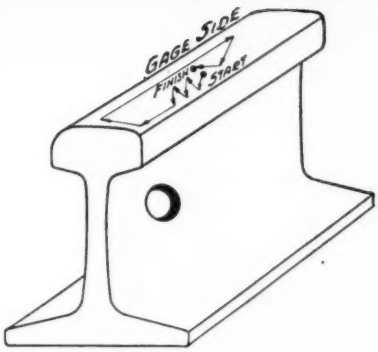
Above—A Joint After The Welding and Grinding Work Has Been Completed. Right —Illustrating Recommended Procedure for Building Up Rail Ends When Using the Amsco Railface Electrodes

tractor and scraper. Line pulls are said to be ample to meet the most severe service requirements imposed by scraper operation. The drum, which is 9 in. in diameter and 5 in. long, has a flange diameter of 15 in. and has a capacity of 150 ft. of ½-in. cable. Each of the drum clutches has 12 facings with friction surface areas of 564 sq. in., while the effective brake area is 111 sq. in.

New Electrode For Rail Welding

THE American Manganese Steel division of American Brake Shoe Company, Chicago Heights, Ill., is now offering the Amsco "Railface" electrode, which has been developed specifically for use in building up high-carbon rail. The use of this electrode, which can be used with alternating current, straight polarity, or direct current, as desired, is said to result in a weld which is homogeneous with the rail and which is free from porosity or cracks. Also, it is said, the deposits from this electrode have high impact and wear-resisting qualities which assure a long period of satisfactory service. The electrode is available in 3/16-in. and ¼-in. sizes, and in lengths of 14 and 18 in.

When using this electrode for building up rail ends, the rail head in the joint area is prepared for welding by grinding off the spalled and battered material, after which it is preheated to 700 deg. F., the area of heating being extended to a point 2 to 3 in. beyond the limit of the proposed weld, to eliminate stresses which otherwise might develop from the welding. The Railface electrode is then brought into use, using 175 to



200 amp. for a 3/16-in. electrode, or 225 to 275 amp. for a ¼-in. electrode.

In making a weld with the new electrode, the welder starts at a point near the rail end on the outside of the head and proceeds across the rail end. He then carries the weld along the gage side the desired distance, after which he returns it diagonally across the rail to the starting point. Finally he fills in the area thus enclosed and craters the weld in the center of this area. Post-heating the weld to about 1100 deg. F. immediately after welding is recommended, the greater portion of the heat being directed away from the rail end. The heated area should extend about three inches beyond the weld. To avoid the development of grinding checks, it is recommended that, after post-heating, the rail end be protected with a covering of flake asbestos, the purpose being to retain as much heat in the rail as possible until grinding operations can be started. When the asbestos is removed, the welded section may then be ground to conform with the balance of the rail section.

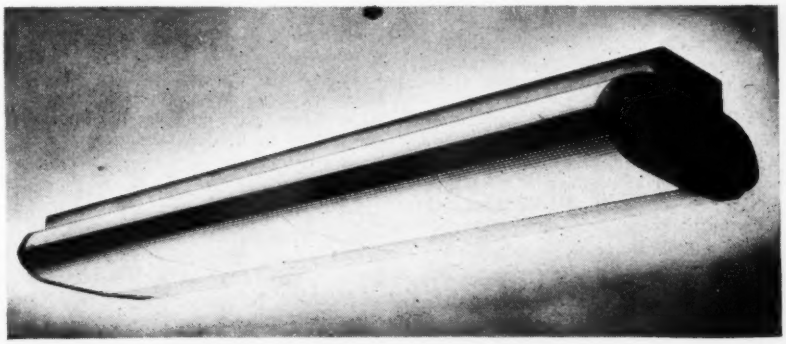
When the above procedure is followed, welds produced with the Railface electrode are reported to have a Brinell hardness of about 325, and that after work-hardening the figure is approximately 385.

Fluorescent Fixture

THE Holophane Company, Inc., New York, has announced a new type fluorescent lighting fixture, known as the surface-attached Holoflux, which is fitted with a special lens called the Controlens. This fixture is designed to accommodate two or three fluorescent tubes, is 8⅜ in. deep, and may be mounted directly against the ceiling or suspended on stems. The unit may be used singly or ganged together to form fixtures of extended lengths.

A special feature of this fixture is the new curved-type Controlens which forms the under side of the fixture and two special lenses on each side of the fixture at the top. The purpose of the bottom lens is to collect the light rays from the tube and bend them downward in an intensive pattern, which action is said to provide maximum illumination over the proper areas and to eliminate glare at normal viewing angles. Each upper lens is a refractory section which is said to spread an appreciable amount of illumination across the ceiling, thus softening shadows and reducing the contrast of brightness between the unit and the ceiling.

This fixture is streamlined in design and is said to lend itself readily to modern architectural interiors, being specially adapted for offices, drafting rooms, and other locations where close work is required over long periods.



The Holoflux Fluorescent Fixture with Controlens

(For additional information on any of the products described on this page, use postcards, page 741)

Changes in Railway Personnel

General

Karl A. Borntrager, superintendent of the Mohawk and Hudson division of the New York Central, at Albany, N.Y., and an engineer by training and experience, has been appointed assistant to vice-president, with headquarters at Chicago.

O. K. Lawson, assistant chief of personnel of the Chesapeake & Ohio, at Richmond, Va., and an engineer by training and experience, has been appointed superintendent of terminals, at Walbridge, Ohio, a newly-created position.

Charles E. Lawall, engineer of coal properties of the Chesapeake & Ohio, with headquarters at Huntington, W. Va., has been appointed assistant vice-president, with the same headquarters, succeeding **Ira F. Davis,** who retired on July 1, after more than 27 years of continuous service with that company.

H. D. Barnes, assistant comptroller of the Chicago & North Western, at Chicago, and an engineer by training and experience, has been promoted to comptroller, with the same headquarters, succeeding **C. H. Westbrook,** who has retired. **W. R. Kettenring,** auditor of disbursements, at Chicago, and an engineer by training and experience, has retired.

Engineering

G. Harrison, resident engineer on the Canadian National, with headquarters at Winnipeg, Man., has retired.

E. G. Hewson, office engineer on the Canadian National, with headquarters at Toronto, Ont., has retired.

H. Lewis Hardy, assistant to the district engineer on the Boston & Albany, at Boston, Mass., retired recently after 42 years of service.

N. M. Kelly has been appointed division engineer on the Canadian Pacific, at Montreal, Que., succeeding **W. B. Harper,** who has retired.

A. K. McKeithan, assistant engineer on the Missouri Pacific, has been appointed division engineer, with headquarters at Houston, Tex.

R. E. Tew, senior assistant division engineer on the Seaboard Air Line, at Savannah, Ga., has been promoted to division engineer, with headquarters at Americus, Ga.

A. O. Jones, assistant engineer on the Chesapeake & Ohio, at Richmond, Va., has been promoted to assistant division engineer, with headquarters at Hinton, W. Va., succeeding **C. H. Manning,** who has been appointed assistant trainmaster at Gauley, W. Va.

Bernard J. Minetti, assistant bridge engineer of the Central of New Jersey, has been promoted to bridge engineer, with headquarters at Jersey City, N. J., to succeed **Joseph J. Yates,** who has retired after 44 years of service. Mr. Yates was born at Elizabeth, N. J., on April 20, 1873, and attended Rutgers college, receiving his B. A. degree in 1894. He entered railroad service in 1894 with the Pennsylvania, and one year later he went with the Central of New Jersey, holding the position of assistant engineer of that road from 1895 to 1898 and from 1903 to 1907. He was appointed bridge engineer in the latter year.

Marshall Cox Jennette, whose appointment as engineer maintenance of way of the Norfolk Southern at Norfolk, Va., was reported in the July issue, was born on June 19, 1909, at Goldsboro, N. C. Mr. Jennette received his B. S. in civil engineering from North Carolina State college in 1932 and entered railroad service on June 13, 1932, as apprentice section foreman with the Seaboard Air Line, serving at Chester, S. C., and Birmingham, Ala., until July 1, 1933, when he became

M. C. Jennette

assistant to division engineer at Jacksonville, Fla. From June 1, 1937, to November 1, 1946, Mr. Jennette served as assistant division engineer of the Seaboard Air Line at Raleigh, N. C., going with the Norfolk Southern at Norfolk on the latter date as special representative in the office of the president, where he remained until his recent appointment as engineer maintenance of way.

R. W. Mauer, assistant engineer in charge of the engineering drafting room of the Atchison, Topeka & Santa Fe at Chicago, has been promoted to assistant engineer in the office of the chief engineer, system, with the same headquarters, succeeding **R. L. Cochrane,** who was retired recently.

M. A. McGee, assistant division engineer, Evansville division, on the Louisville & Nashville, at Evansville, Ind., has been promoted to division engineer, Eastern Kentucky division, with headquarters at Ravenna, Ky., succeeding **I. W. Newman,** who has been transferred to the Cincinnati division, with headquarters at Latonia, Ky., to replace **J. B. Clark,** who has been transferred to the Birmingham division, with headquarters at Birmingham, Ala., where he succeeds **R. M. Leeds,** who has retired. **C. E. Stoecker,** assistant supervisor of bridges and buildings, Montgomery and New Orleans division, at Mobile, Ala., has been promoted to assistant division engineer Evansville division, with headquarters at Evansville, succeeding Mr. McGee.

Donald E. Rudisill, whose appointment as chief engineer of maintenance of way of the New York zone of the Pennsylvania at New York was reported in the July

D. E. Rudisill

issue, was born at Mount Carmel, Pa. Mr. Rudisill received his civil engineering degree from Gettysburg college, Gettysburg, Pa., in 1922. He has served on various divisions of the Pennsylvania since he first entered its service during the summer vacation of 1918 as a laborer in the Altoona car shops. From October 1, 1940, to April 16, 1942, he was division engineer of the New York division, with headquarters at Jersey City, N. J., then becoming engineer of maintenance of way of the Western Pennsylvania division at Pittsburgh, Pa., which position he was holding at the time of his recent appointment as chief engineer of maintenance of way of the New York zone.

A. H. Stimson, division engineer on the Eastern division of the Pennsylvania, has been transferred as division engineer in the office of the chief engineer maintenance of way of the Central region, with headquarters at Pittsburgh, Pa. **C. R. Montgomery,** division engineer on the Cleveland division, has been transferred to the Eastern division, succeeding Mr. Stimson and **W. P. Conklin,** division engineer on the Toledo division, succeeds Mr. Montgomery on the Cleveland division. **S. M. Rodgers,** assistant division engineer on the Philadelphia division, has been promoted to division engineer on the Toledo division, succeeding Mr. Conklin, and **J. W. Buford,** assistant division engineer, office of the chief engineer, at Philadelphia, Pa., has been appointed assistant division engineer on the Philadelphia division, to succeed Mr. Rodgers.

Carl R. Bergman, whose appointment as engineer maintenance of way of the Western Pennsylvania division of the Pennsyl-

vania at Pittsburgh, Pa., was reported in the July issue, was born at Warren, Pa., and was graduated from Pennsylvania State college in 1928. While still a student in 1927, he entered the service of the Pennsylvania as an assistant on the engineer corps at Philadelphia, Pa. After

C. R. Bergman

completing his education he was transferred in that capacity to New York. Mr. Bergman was promoted to assistant supervisor of track in November, 1928, and served in this capacity at several points, until he was appointed supervisor of track in 1933. In 1943 he was appointed assistant division engineer of the Maryland division and in May, 1944, he was promoted to division engineer of the Renovo division at Erie, Pa. In December, 1944, Mr. Bergman was transferred to the Chicago Terminal division at Chicago, where he served until his recent appointment as engineer maintenance of way at Pittsburgh, Pa.

A. L. Bartlett, engineer, maintenance of way of the New York, New Haven & Hartford at New Haven, Conn., has been

A. L. Bartlett

appointed assistant to chief engineer, with the same headquarters. **A. A. Cross,** general assistant engineer has been appointed engineer, maintenance of way, with headquarters as before at New Haven.

Mr. Bartlett was born at Claremont, N. H., on November 22, 1884, entered railroad service in 1909 as transitman and resident engineer on the Northern Pacific, served as surveyor with the U. S. Engineers, and joined the New Haven in 1912 as a transitman. In 1914 he was promoted to assistant engineer, and became track supervisor in 1915. From 1917 to 1919 Mr. Bartlett served in the armed forces, and in 1920 he returned to the New Haven as assistant division engineer. He was promoted to division engineer in 1923, and to maintenance engineer in 1930. In 1931 he was advanced to engineer, maintenance of way, the position he held at the time of his recent promotion.

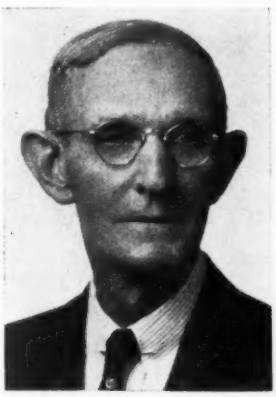
H. E. Kirby, assistant engineer on the Chesapeake & Ohio, at Richmond, Va., has been appointed cost engineer, with the same headquarters, succeeding **C. H. R. Howe,** who has retired.

Mr. Kirby was born at Alderson, W. Va., on September 2, 1903, attended the college of engineering of West Virginia university, entered the service of the Chesapeake & Ohio on September 1, 1926, and served as rodman, instrumentman, and draftsman until July 15, 1927, when he was appointed assistant cost engineer, at Clifton Forge, Va. On June 1, 1929, Mr. Kirby was promoted to assistant cost

H. E. Kirby

engineer, system, at Richmond, Va., and on August 1, 1936, he was advanced to assistant engineer, system, special duties, with the same headquarters, the position he held at the time of his recent promotion.

Mr. Howe was born at West Boylston, Mass., on February 12, 1876, received his higher education at Dartmouth college, entered railroad service in February, 1903, as a rodman—transitman on the New York Central at Boston, Mass., and became assistant resident engineer, at Cleveland, Ohio, in November, 1905. In February, 1906, he joined the Baltimore & Ohio as a draftsman, at Baltimore, Md. After more than two years of service in the Panama Canal Zone, as draftsman and chief draftsman, Mr. Howe returned to the B. & O., as a draftsman, at Baltimore. He became assistant division engineer at Chillicothe, Ohio, in December, 1911, division engineer, at Cincinnati, Ohio, in July, 1913, and master carpenter, at Chillicothe, in March, 1914. From February, 1916, to September, 1917, he served as division engineer at Flora, Ill., and at Chillicothe, and from September, 1917, to January, 1918, as assistant to the chief engineer, maintenance of way, at Cincinnati. In January, 1918, Mr. Howe was appointed engineer of construction of the Monongahela Southern (now leased to Union Railroad Company, which is controlled by the United States Steel Corporation), at Pittsburgh, Pa., and served



C. H. R. Howe

in that capacity until July, 1921, when he was appointed assistant to the chief engineer of the Philadelphia Company, also at Pittsburgh. In September, 1925, Mr. Howe entered the service of the Chesapeake & Ohio as cost engineer, with headquarters at Richmond, the position he held at the time of his retirement.

H. B. Christianson, whose promotion to principal assistant engineer, system, on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, was reported in the July issue, was born at Minneapolis, Minn., on September 24, 1892, and was graduated in civil engineering by the University of Minnesota in 1915. He entered the service of the Milwaukee on March 1, 1917, as a field draftsman in the valuation department. Released from

H. B. Christianson

the armed forces, he returned to the Milwaukee in January, 1919, and served as instrumentman and assistant engineer until March, 1925, when he was appointed division engineer, in which capacity he served at various points in Iowa, Montana, Wisconsin, and Illinois. In October, 1942, Mr. Christianson entered the armed forces, served almost three years overseas,

and returned to the Milwaukee in January, 1946, as assistant to chief engineer.

B. J. Ornburn, whose promotion to engineer and superintendent of bridges and buildings, system, on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, was reported in the

B. J. Ornburn

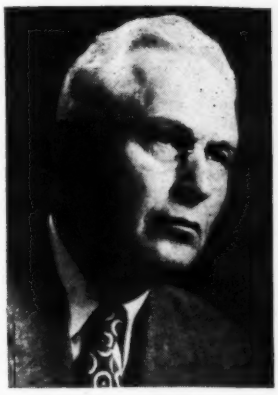
July issue, was born at Granville, Mo., on July 21, 1900, and received his higher technical training at the University of Missouri. He entered railroad service in June, 1922, as a rodman on the Wabash, at Moberly, Mo., and in April, 1923, he became a detailer and checker of designs and plans for the Missouri State Highway Commission, at Jefferson City, Mo. He entered the service of the Marland Refining Company in March, 1926, as a structural engineer, at Ponca City, Okla., and served in that capacity until June, 1927, when he was appointed structural engineer in charge of the drafting room of Harrington, Howard & Ash, consulting engineers, at Kansas City, Mo. In November, 1929, he joined the Montana State Highway Department as design engineer, and became bridge engineer in May, 1931. Four years later he was named bridge design engineer. In April, 1942, he was appointed assistant engineer of the Northern Pacific at Seattle, Wash., and was advanced to assistant bridge engineer a year later. In August, 1946, he entered the service of the Milwaukee as assistant bridge engineer.

Changes on the C.&N.W.

A. R. Harris, assistant engineer of bridges of the Chicago & North Western, at Chicago, has been promoted to engineer of bridges, with the same headquarters, succeeding **A. E. Bechtelheimer,** who has retired. **W. L. Anderson,** assistant general bridge inspector at Chicago, has been promoted to assistant engineer of bridges, with the same headquarters, succeeding Mr. Harris. **P. V. Thelander,** division engineer, Galena division at Chicago, has been promoted to assistant engineer of maintenance, with the same headquarters, succeeding **F. W. Hillman** who has retired. **H. W. Jensen,** office engineer in the chief engineer's office at Chicago, has been appointed division engineer, Galena division at Chicago, succeeding Mr. Thelander. **M. S. Reid,** roadmaster, Iowa division, at Ames, Iowa, has been promoted to principal assistant engineer, chief engineer's office, at Chicago, succeeding **G. A. Saint,** who has retired. **F. W. Creedle,** division engineer, Lake Shore division, at Green Bay, Wis., has been transferred to the Wisconsin division, with headquarters at Chicago, succeeding **C. H. Perry,** who has retired. **L. C. Smith,** division engineer, Peninsula division, at Escanaba, Mich., has been transferred to the Madison division, with headquarters at Madison, Wis., succeeding **R. W. Richardson,** who has retired. **J. P. Datesman,** division engineer, Dakota division, at Huron, S. D., has been transferred to the Lake Shore division, with headquarters at Green Bay, succeeding Mr. Creedle. **W. H. Huffman,** division engineer, Western division, of the Chicago, St. Paul, Minneapolis & Omaha (part of the North Western System) at St. Paul, Minn., has been transferred to the Peninsula division, with headquarters at Escanaba, succeeding Mr. Smith. **H. H. Hall,** assistant engineer, Madison division, at Madison, Wis., has been promoted to division engineer, Western division of the C. St. P. & M. & O., with headquarters at St. Paul, succeeding Mr. Huffman. **J. W. Johnson,** assistant engineer, Dakota division, at Huron, S. D., has been promoted to division engineer on the same division, with the same headquarters, succeeding Mr. Datesman. **J. L. Perrier,** assistant engineer, Iowa division, at Boone, Iowa, has been promoted to office engineer, chief engineer's office, at Chicago, succeeding Mr. Jensen. **R. D. Culbertson,** instrumentman, Lake Shore division, Green Bay, Wis., has been promoted to assistant engineer, Madison division, with headquarters at Madison, Wis., succeeding Mr. Hall. **A. B. Zaborowski,** instrumentman, Wisconsin division, at Chicago, has been promoted to assistant engineer, Dakota division, at Huron, S. D., succeeding Mr. Johnson. **H. F. Braden,** instrumentman, Galena division, at Chicago, has been promoted to assistant engineer, Iowa division, at Boone, Iowa, succeeding Mr. Perrier. **J. F. Shanklin,** instrumentman, Galena division, at Chicago, has been promoted to assistant general bridge inspector at Chicago, succeeding Mr. Anderson.

Mr. Bechtelheimer was born at Eldena, Ill., on April 4, 1881, and attended Iowa State college and the University of Wisconsin. He entered railway service in October, 1905, as a chainman on the North Western at Boone, Iowa, and in April, 1906, he was promoted to rodman. A year later he was advanced to instrumentman and from June, 1908, to February, 1910, he served as a draftsman and instrumentman. In March, 1912, he was appointed a bridge draftsman, with headquarters at Chicago, and in May, 1913, he was promoted to assistant general bridge inspector, with the same headquarters. Mr. Bechtelheimer was advanced to general bridge inspector in March, 1920, and in December, 1928, he was promoted to assistant engineer of bridges. On September 1, 1941, he was advanced to engineer of bridges, with headquarters as before at Chicago.

Mr. Jensen was born at McHenry, Ill., on May 18, 1899, received his higher technical training at the University of Wisconsin, and entered the service of the North Western in 1925 as a rodman, at Chicago. He was appointed assistant general bridge inspector in 1929, construction accountant in 1930, assistant roadmaster in 1935, and assistant engineer



A. E. Bechtelheimer

in 1936. In 1938 he was transferred to the Chicago, St. Paul, Minneapolis & Omaha (part of the North Western System), in the same capacity, at St. Paul, Minn. Mr. Jensen was appointed division engineer on April 1, 1943, entered the armed forces on September 1, 1944, and returned to St. Paul as division engineer on January 16, 1946. On March 1, 1946, he was advanced to office engineer at Chicago, the position he held at the time of his recent promotion.

Track

B. R. Perfect, track supervisor on the Kent division of the Erie, at Marion, Ohio, has been transferred to Dunmore, Pa., to succeed **M. E. Condon,** who in turn succeeds Mr. Perfect at Marion.

W. C. Cagle, who has been on leave of absence on account of illness, has returned to his post as roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal. **J. L. Alter** has been appointed assistant roadmaster at Los Angeles.

R. L. Harwood, assistant supervisor of track on the Illinois Central, at Jackson, Miss., has been promoted to supervisor of track, with headquarters at Mendenhall, Miss., succeeding **B. A. Williamson,** who has been transferred to Reevesville, Ill., to replace **J. C. Clapp,** deceased.

J. A. Wilkinson, assistant roadmaster on the Iowa Division of the Chicago & North Western, has been promoted to roadmaster of the same division, with headquarters at Ames, Iowa, succeeding **M. S. Reid,** whose promotion to principal assistant engineer, chief engineer's office, at Chicago, is reported elsewhere in these columns.

T. A. Spatafore, assistant roadmaster on the Chicago, Milwaukee, St. Paul & Pacific, at Missoula, Mont., has been promoted to roadmaster, at Lewistown, Mont.,

(Continued on page 792)

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(*Continued from page* 790)

succeeding **R. M. Hale,** who has been transferred to Butte, Mont., where he replaces **A. Jersey,** who has retired. **Tom Prata** has been appointed assistant roadmaster at Missoula, succeeding Mr. Spatafore.

P. R. Matthews, assistant supervisor of track of the Chesapeake & Ohio, at Marion, Ohio, has been promoted to supervisor of track, with headquarters at Columbus, Ohio, succeeding **C. W. Butcher,** who has been transferred to Marion, where he replaces **F. A. Sparks,** who has retired after 27 years of service with the C. & O. **P. W. Shenefield,** assistant cost engineer, succeeds Mr. Matthews as assistant supervisor of track at Marion.

Changes on the Pennsylvania

R. V. Young, assistant supervisor of track on the Pittsburgh division of the Pennsylvania, at East Liberty, Pa., has been promoted to supervisor of track on the Cincinnati division, with headquarters at Anderson, Ind., to succeed **R. E. Miller,** who has been transferred to other duties for reasons of health. **Peter DiPaolo,** general foreman on the Pittsburgh division, has been promoted to assistant supervisor of track on that division, with headquarters at East Liberty, succeeding Mr. Young.

E. J. Sierleja, assistant supervisor of track on the Pittsburgh division of the Pennsylvania, at Cresson, Pa., has been transferred to the Maryland division, with headquarters at Baltimore, Md., to succeed **W. R. Kauffman,** resigned. **H. O. Stratton,** assistant on the engineer corps, Philadelphia division, has been promoted to assistant supervisor of track, with headquarters at Cresson.

G. A. Godley, supervisor of track on the Pennsylvania, at Terre Haute, Ind., has been transferred to the Eastern division, with headquarters at Alliance, Ohio, to succeed **A. M. Kennedy,** resigned. **I. C. Golab,** supervisor of track on the New York division, at Trenton, N.J., has been transferred to Terre Haute, to succeed Mr. Godley. **E. Wollett, Jr.,** supervisor of track at Kalamazoo, Mich., has been transferred to Trenton, succeeding Mr. Golab, and **R. E. Gorsuch,** assistant supervisor of track on the Middle division, at Newport, Pa., has been promoted to supervisor of track on the Grand Rapids division, with headquarters at Kalamazoo, succeeding Mr. Wollett. **G. P. Campbell,** assistant supervisor of track at Columbus, Ohio, has been transferred to Newport, to succeed Mr. Gorsuch and **R. E. Kleist,** assistant on the engineer corps, Eastern division, has been promoted to assistant supervisor of track on the Columbus division, to succeed Mr. Campbell.

G. A. Royce, supervisor of track on the Long Island, has been appointed supervisor of track in the office of the chief engineer on the Pennsylvania, with headquarters at Philadelphia, Pa., and **A. K. Howe,** supervisor of track on the Cincinnati division, has been appointed supervisor of track on the Long Island, with headquarters at Jamaica, N.Y., to succeed Mr. Royce. **J. T. Evans,** supervisor of track on the Delmarva division, has been transferred to the Cincinnati division, to succeed Mr. Howe, and **A. B. Baker,** supervisor of track on the Grand Rapids division, succeeds Mr. Evans on the Delmarva division. **D. A. Sutherland,** assistant supervisor of track on the Eastern division, has been promoted to supervisor of track on the Grand Rapids division, succeeding Mr. Baker and **V. B. Siems, Jr.,** assistant supervisor of track on the Cleveland division, succeeds Mr. Sutherland on the Eastern division. **C. R. Burke,** assistant on the engineer corps, Central region, has been promoted to assistant supervisor of track on the Cleveland division, succeeding Mr. Siems.

Bridge and Building

R. W. Roberts, assistant supervisor of bridges and buildings on the New York Central, at Corning, Ohio, has retired after 24 years' service.

J. P. Bolling, assistant engineer on the Louisville & Nashville, at Louisville, Ky., has been promoted to assistant supervisor of bridges and buildings, Montgomery and New Orleans division, with headquarters at Mobile, Ala., succeeding **C. E. Stoecker,** whose promotion to assistant division engineer, Evansville division, at Evansville, Ind., is reported elsewhere in these columns.

C. C. Sims, assistant supervisor of bridges and buildings on the Chesapeake & Ohio, at Hinton, W. Va., has been promoted to supervisor of bridges and buildings, with the same headquarters, succeeding **T. H. Allen,** who has retired after 46 years of service. **R. P. Wilson,** carpenter foreman, succeeds Mr. Sims as assistant supervisor of bridges and buildings, at Hinton. **J. E. Heck,** assistant supervisor of bridges and buildings, at Ashland, Ky., has been promoted to supervisor of bridges and buildings, with the same headquarters, succeeding **A. D. Agnew,** who has retired after 63 years of service with the C. & O. **Clyde Williams,** carpenter foreman, succeeds Mr. Heck as assistant supervisor of bridges and buildings, at Ashland.

Obituary

C. C. Westfall, engineer of bridges of the Illinois Central, at Chicago, died in that city on July 23.

Harry M. Ivins, master carpenter on the Central division of the Central of New Jersey, died recently.

Lt. Col. William S. Fetherstonaugh, who retired in 1939 as divisional construction engineer on the Canadian National in Alberta, died recently at Victoria, B.C.

Gus Daniel, retired roadmaster on the Atlantic Coast Line, at Lakeland, Fla., died recently after a brief illness.

J. B. Martin, who retired on September 30, 1942, as general inspector of track on the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio, died at his home in that city on July 11. At the time of his death he was general inspector of the Woodings-Verona Tool Works and the Woodings Forge & Tool Co., with headquarters at Chicago.

Association News

National Railway Appliances Association

Announcement has been made by President C. L. Mellor that the exhibit of the association next spring, March 15-18, in conjunction with the annual meeting of the American Railway Engineering Association, will be held at the International Amphitheater, where the exhibit was held for a number of years prior to the war. Inquiries concerning the exhibit should be addressed to C. H. White, secretary of the association, with headquarters at 208 S. LaSalle street, Chicago.

Bridge & Building Association

A meeting of the Executive committee was held in Chicago on July 10, when preliminary drafts of all of the eight reports to be presented before the annual meeting on September 16-18, were reviewed. Preprints of these reports will be available at the annual meeting, so that those present can follow closely the presentation of the various subjects. As noted elsewhere in these columns, the meeting this year, as last year, will be held at the Hotel Stevens, concurrent with the annual meeting of the Roadmasters' Association and a joint exhibit of the Bridge & Building Supply Men's Association and the Track Supply Association.

Roadmasters' Association

The Executive committee of the association met in Chicago on July 21 to make final plans for the annual meeting to be held at the Hotel Stevens, Chicago, September 16-18, and to review preliminary drafts of the technical committee reports that have been prepared for presentation at the

(*Continued on page* 794)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

American Railway Engineering Association—Annual Meeting, March 16-18, 1948, Chicago.

American Wood-Preservers' Association—Annual meeting, April 27-29, 1948, St. Paul, Minn.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association.

Maintenance of Way Club of Chicago—Next meeting, October 27, 1947.

National Railway Appliances Association—Thirty-third annual exhibit, Chicago, March 15-18, 1948, in connection with A.R.E.A. convention.

Railway Tie Association—Annual meeting, September 23-25, 1947, Arlington hotel, Hot Springs, Ark.

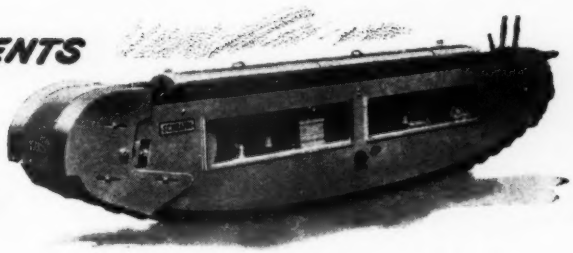
Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association.

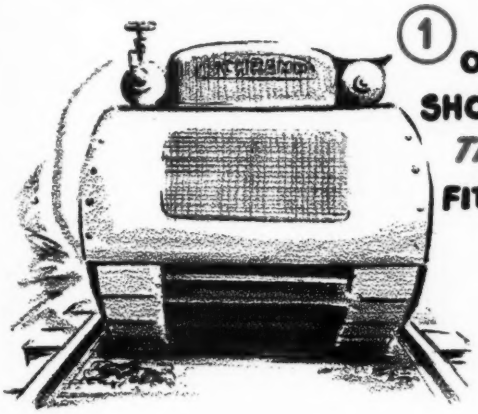
SCHRAMM INC. PRESENTS

The CRAWLER

FOR TAMPING MORE TIES PER DAY IN "HOT TERRITORY" DESPITE FREQUENT INTERRUPTIONS



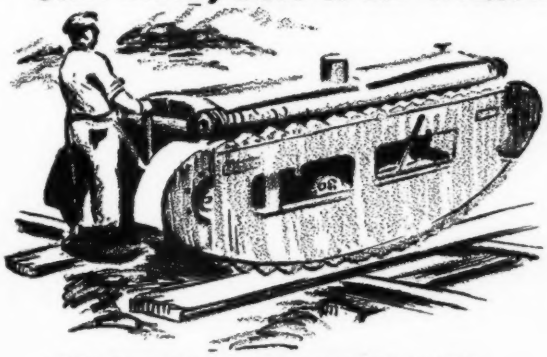
Built in capacities ranging from 105 to 315 cubic feet per minute actual air capacity and powering up to 24 tampers.



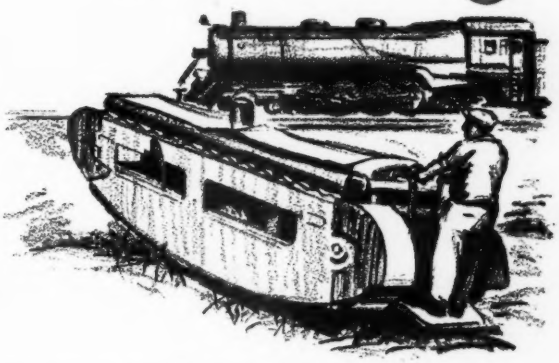
(1) ON "NARROW SHOULDER" TRACK THE CRAWLER FITS BETWEEN THE RAILS

(2) TRAIN COMING! SIGNALS THE LOOKOUT

(3) CURVED TREAD SPINS CRAWLER "ON A DIME", GETS IT OFF TRACK IN A JIFFY



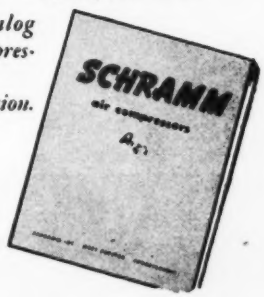
OUT OF THE WAY TO ALLOW TRAINS PASSING-BACK TO WORK IN A MINUTE (4)



MAINTENANCE OF WAY MEN SAY THE *CRAWLER'S* QUICK MOBILITY HELPS THEM TO TAMP TWICE AS MANY TIES IN A DAY

EXHIBITOR BRIDGE & BUILDING ROCK SUPPLY

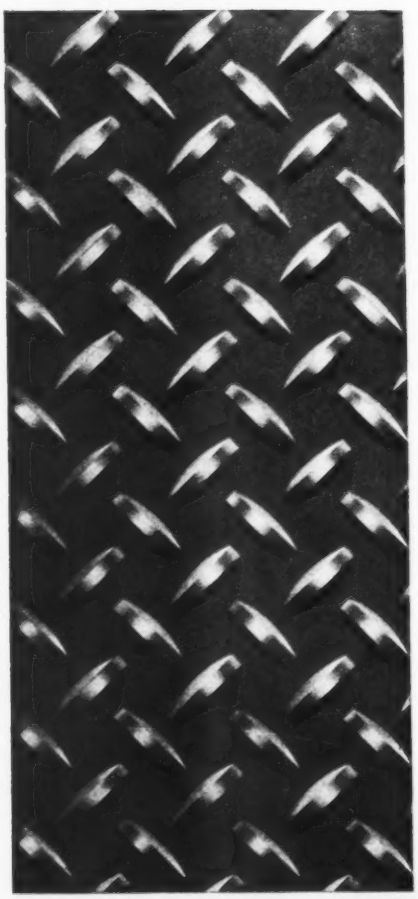
• *Get your copy of the Schramm Catalog which lists portable and stationary compressors from 20 to 420 cubic foot capacity. Address Railway Sales Division.*



SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Feet are . . .
GEARED to the Floor



With
INLAND 4-WAY FLOOR PLATE

The angular projections on this safety steel flooring grip foot or wheel like a gear tooth, providing positive traction in all directions and greatly reducing the hazard of slipping or falling.

Liquids drain off freely from Inland 4-Way Floor Plate, and it is easy to sweep and keep clean. This safety floor plate will not warp, splinter, crack, burn, or absorb liquids or odors like other materials. It is convenient to cut, form, or weld, and lasts for years and years.

Stocked by Leading Steel Distributors

Write for Bulletin

INLAND STEEL COMPANY

38 South Dearborn Street, Chicago 3, Illinois • *Sales Offices:* Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

(*Continued from page 792*)

annual meeting. Again, this year, the meeting will be held concurrent with the annual meeting of the American Railway Bridge & Building Association and a joint exhibit of the Track Supply Association and the Bridge & Building Supply Men's Association.

Wood Preservers' Association

The Executive committee has announced the following committee chairman appointments:

Preservatives—R. H. Baechler, Forest Products Laboratory, Madison

Oak Ties, Lumber and Piles, Pressure Treatment—P. D. Brentlinger, Pennsylvania, Philadelphia, Pa.

Southern Pine Ties and Lumber, Pressure Treatment—E. H. Moore, International Creosoting & Construction Co., Texarkana, Tex.

Poles, Pressure Treatment—G. Q. Lumsden, Bell Telephone Laboratories, Inc., Murray Hill, N. J.

Douglas Fir and Western Hemlock, Pressure Treatment—Paul Wayman, American Lumber & Treating Co., Chicago.

Miscellaneous Species, Ties and Lumber, Poles and Piles, Pressure Treatment—J. D. MacLean, Forest Products Laboratory, Madison, Wis.

Wood Blocks, Pressure Treatment—N. E. Kittell, Joslyn Manufacturing & Supply Co., Franklin Park, Ill.

Inspection—H. F. Round, Pennsylvania, Philadelphia, Pa.

Seasoning Practice—P. B. Mayfield, International Creosoting & Construction Co., Galveston, Tex.

Handling of Forest Products—A. E. Larkin, Republic Creosoting Company, Minneapolis, Minn.

Tie Service Records—W. R. Goodwin, M. St. P. & S. S. M., Minneapolis, Minn.

Bridge and Structural Timber, Service Records—T. H. Strate, C. M. St. P. & P., Chicago.

Marine Pile Service Records—A. S. Daniels, T. & N. O., Houston, Tex.

Pole Service Records—C. H. Amadon, Bell Telephone Laboratories, Inc., New York.

Post Service Records—J. O. Blew, Jr., Forest Products Laboratory, Madison.

Diversified Uses of Treated Wood—Leonard Perez, Wood Preserving Division, Koppers Company, St. Louis, Mo.

Uses of Treated Wood for Car Lumber—W. P. Arnold, Wood Preserving Division, Koppers Company, Orrville, Ohio

Fire Retardant Treatment of Wood—G. M. Hunt, Forest Products Laboratory, Madison, Wis.

Preservative and Fire Retardant Treatment of Laminated Members (Plywood and Glued-up Fabrication)—D. L. Lindsley, J. H. Baxter & Co., Los Angeles, Calif.

Gum Ties and Lumber, Pressure Treatment—W. W. Ward, Pennsylvania, Philadelphia, Pa.

Poles, Non-Pressure Treatment—C. M. Sporley, Valentine-Clark Corporation, St. Paul, Minn.

At a meeting of the Executive committee at the Bismarck Hotel, Chicago, on July 15, J. A. Vaughan, research engineer, Southern Wood Preserving Company, Atlanta, Ga., was appointed a director of the association to fill the vacancy created by the resignation of R. H. White, Jr., president, Southern Wood Preserving Company, Atlanta, Ga.

Track Supply Association; B.&B. Supply Men's Association

According to Director of Exhibits Lewis Thomas, representing both of these associations, 88 companies have already contracted for 144 booths at the joint exhibit of these associations to be held at the Hotel Stevens, Chicago, September 15-18, in connection with the concurrent annual

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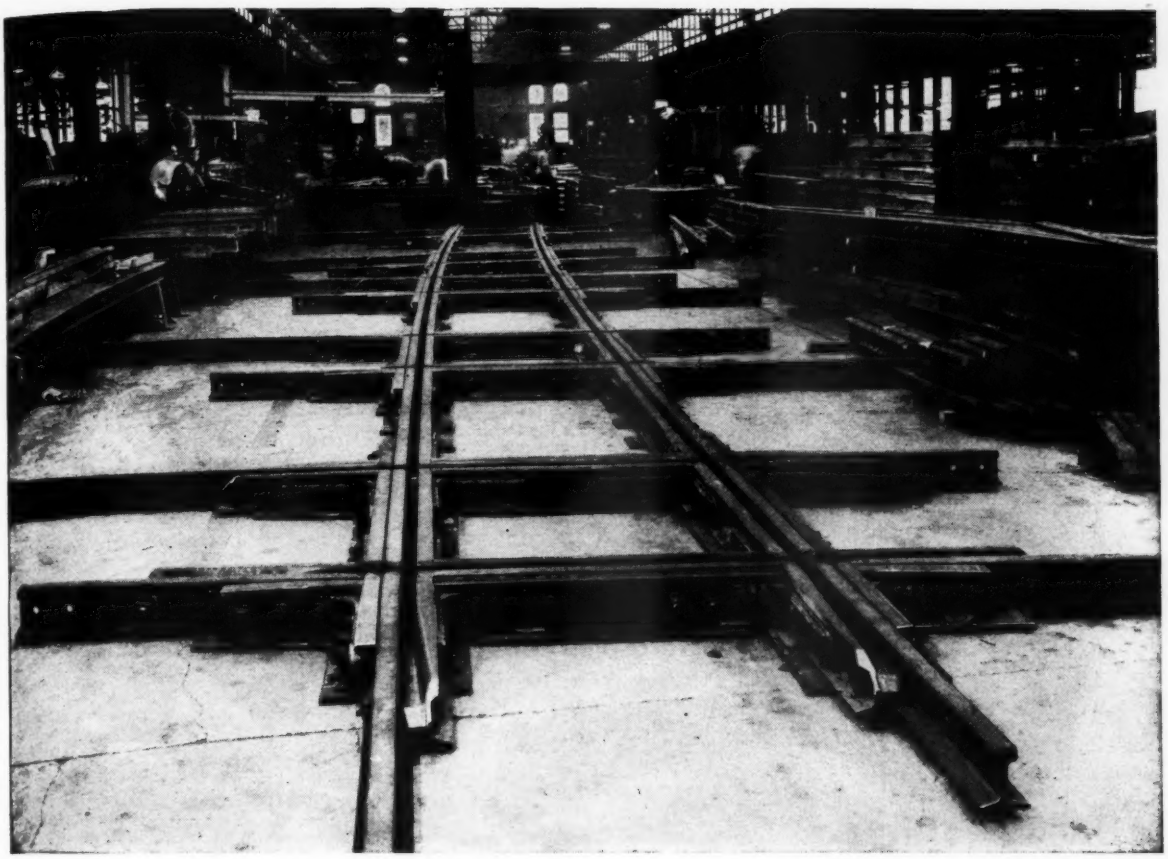


A layout of five Heat-Treated Crossings for Jacksonville Terminal Company, awaiting final inspection in the Weir Kilby Cincinnati Plant

● ● ● ● Material of such rugged construction and precise design is required by the railroads to maintain their heavy and fast freight and passenger schedules.

During 1945 the railroads of the United States spent more than one and one-half billion dollars for material and equipment, a necessary expenditure to maintain this vital element of the national economy.

Positive action must be taken to assure the railroads a fair revenue so that they in turn can continue to render their essential service to the nation.

Standard and Special Track Work for Steam Railroads Since 1882

WEIR KILBY CORPORATION

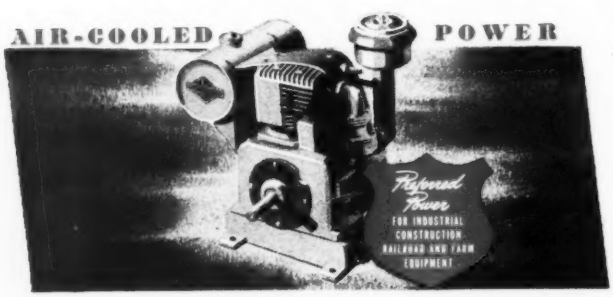
CINCINNATI 12, OHIO — **BIRMINGHAM 7, ALA.**

Successors to

WEIR FROG CO. . . . KILBY FROG & SWITCH CO. . . . CINCINNATI FROG & SWITCH CO.

The ever-increasing *preference* of users and dealers for equipment powered by engines bearing this world-famous trade mark, is a tribute to the record for *dependable operation* made by *more than 3 million* Briggs & Stratton 4-cycle air-cooled engines. Because they incorporate the constant engineering advancements . . . improved methods of precision mahufacture . . . technical knowledge and experience of over 27 years of *continuous production*—today's Briggs & Stratton engines have no equal in value and performance.

BRIGGS & STRATTON CORPORATION, MILWAUKEE 1, WIS., U. S. A.



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meetings of the Roadmasters' and the Bridge & Building associations. With some exhibit space still available, companies that desire to take part in the exhibit should address Mr. Thomas, 59 E. Van Buren street, Chicago.

Following are the names of eight companies which made arrangements to exhibit during the past month. This list supplements the list of 80 companies, presented in the July issue, which had arranged earlier for exhibit space.

Joyce-Cridland Company, Dayton, Ohio
Fairbanks, Morse & Co., Chicago
Power Ballaster Company—Division of Pullman-Standard Car Manufacturing Company, Chicago
Hose Accessories Company, Philadelphia, Pa.
Morrison Metalweld Process, Inc., Buffalo, N. Y.
Conley Frog & Switch Co., Memphis, Tenn.
Bay State Abrasive Products Company, Westboro, Mass.

American Railway Engineering Association

Only one committee is scheduled to meet in August, this being the Committee on Buildings, which will meet at Baltimore, Md., on August 7 and 8. On August 12 the Board of Direction will meet at Chicago, and most important among the items of business to be considered is a recommended increase in the membership dues. This matter is to be placed before the members by letter ballot at a later date.

Four committees held meetings in July, as follows: The Committee on Water Service and Sanitation, at the association's headquarters at Chicago on July 10; the Committee on Economics of Railway Labor, at Albany, N.Y., on July 15; the Committee on Records and Accounts, at St. Paul, Minn., on July 22 and 23; and the Committee on Iron and Steel Structures, at Cincinnati, Ohio, on July 30 and 31. On July 16 those attending the meeting of the Committee on Economics of Railway Labor at Albany were taken on an inspection of continuous welded rail on the Delaware & Hudson.

Copies of both the Proceedings for 1947 and the Manual supplement are expected to be mailed to members early in August.

Supply Trade News

Personal

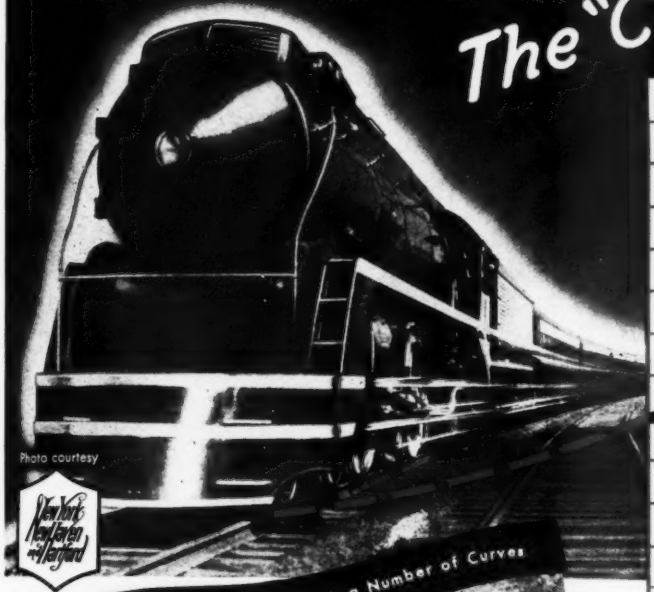
George M. Snyder has been appointed metallurgist of the **Woodings-Verona Tool Works,** with headquarters at Verona, Pa.

John J. Davis, Jr., has joined the staff of the **Inland Steel Company,** at Chicago, and will become manager of sales, Railroad division, on January 1, 1948, when he will succeed to the full responsibilities of **William J. Hammond,** vice-president and manager of sales, Railroad division, who will retire on that date.

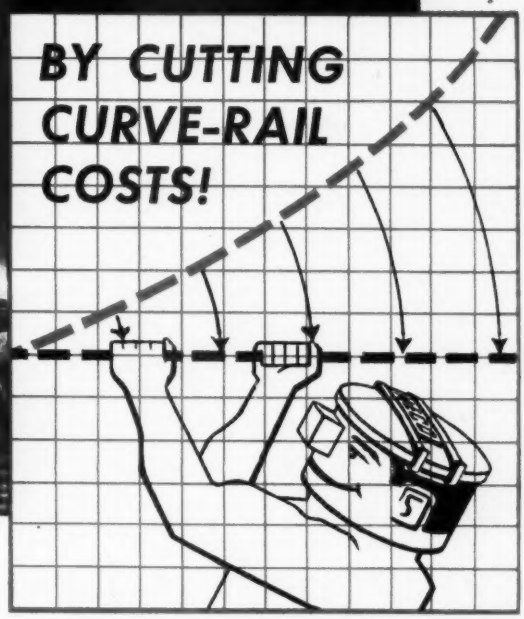
L. E. Bartlett has been appointed sales manager of the treating department of the **T. R. Miller Mill Company,** with headquarters at Brewton, Ala. He was

(*Continued on page* 798)

Straighten Out The "Cost Curve"



BY CUTTING CURVE-RAIL COSTS!



2011

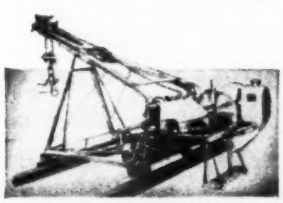
PROLONG CURVE RAIL LIFE WITH

MECO Lubrication

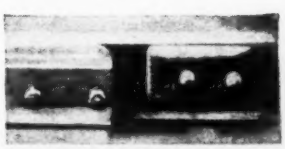
You get Twelve-fold Economy when you install MECO Lubrication: (1) Decrease curve friction. (2) Increase the life of present AND new curve rails two to four times. (3) Reduce wheel flange wear. (4) Increase Train Speeds on curves safely. (Ask us about the other eight.) The sooner you install MECO, the sooner your "curve-cost" curve straightens out!

★ Maintenance Equipment Company ★

RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS



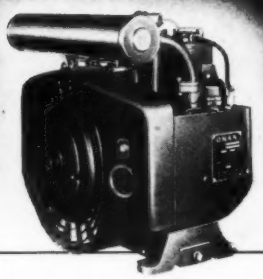
Power Rail Layer Requires No Train Orders



Mack Reversible Switch Point Protectors Make switch rails last 8 to 10 times longer

Two-Cylinder

The NEW ONAN AIR-COOLED 10 H.P. 4 CYCLE "CK" ENGINE



A new, light, compact, easily-installed engine of wide power range. Completely "De Luxe" equipped, easy-to-get-at controls, and many other *plus* points. Prompt delivery on early orders.

ONAN ELECTRIC PLANTS—A.C.—350 to 35,000 watts in standard voltages and frequencies; D.C.—600 to 10,000 watts, 115 and 230 volts. Battery chargers—500 to 6,000 watts, 6, 12, 24, 32 and 115 volts. ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 h.p.; BH: 2-cylinder opposed, 5.5 h.p.; B: 1-cylinder, 2.5 h.p.

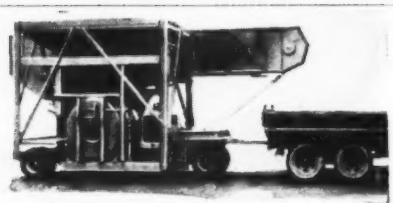
- **HEAVY-DUTY CONSTRUCTION:** Short, sturdy crankshaft. Extra-large bearings.
- **SMOOTH POWER:** Opposed 2-cylinder design. Fully counter-balanced crankshaft.
- **SUPER COOLING:** Axial-flow fan delivers 600 cu. ft. of cool air per minute. Larger fin area.
- **ALUMINUM CONSTRUCTION:** High-strength aluminum castings reduce weight.
- **ELECTRIC STARTING AVAILABLE:** Built-in electric push-button or automatic starting.
- **COMPACT, LIGHT WEIGHT:** Fits into 15 x 19 x 18 inch space. Weighs only 97 pounds.

Onan PRODUCTS

WRITE FOR SPECIFICATIONS

D. W. ONAN & SONS INC.
4428 Royalston Ave. Minneapolis 5, Minn.

ONAN 4-Cycle ENGINES



30* CU. YD-HR PORTABLE CONCRETE PLANT

Write for Data

CAPACITY OF PLANT
Up to 30 cu. yd/hr depending on mixing time.

CAPACITY OF MIXER
Full 3/4 cu. yd. with 10% surcharge capacity.

CAPACITY OF BIN
20 Cu. Yd. heaped 3 equal compartments.

CAPACITY OF AGGREMETER
Full 3/4 cu. yd. with suspension type scale.

CAPACITY OF ELEVATOR
60 Tons/HR handling material weighing 100 lbs. per cu. ft.

OPERATING CONTROLS
All Mixer Bin and AggreMeter Gates hydraulically operated with control levers banked at operator's position.

* 40 Cu. Yd/HR Plant also available.

STRAYER Portable CONCRETE PLANTS

Erie Steel Construction Co., 1178 Geist Rd., Erie, Pa.

BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

(*Continued from page* 796)

previously connected with the Chicago sales office of the American Lumber and Treating Company.

Raymond L. Gillispie, consultant to the rail and track accessories division of the **Bethlehem Steel Company,** at Bethlehem, Pa., has retired.

The **Bates & Rogers Construction Corp.,** Chicago, has announced that **F. L. Copeland,** vice-president, will re-open its western office in San Francisco, Cal., about September 1. The following officers have been elected, at Chicago: **J. W. Rogers,** vice-president and treasurer; **G. N. Martin,** vice-president; **L. J. Bullen,** vice-president; **E. J. Million,** secretary and assistant treasurer.

Edward J. Helline has been appointed general sales manager of the Reliance division of the **Eaton Manufacturing Company.** Mr. Helline has been with the

E. J. Helline

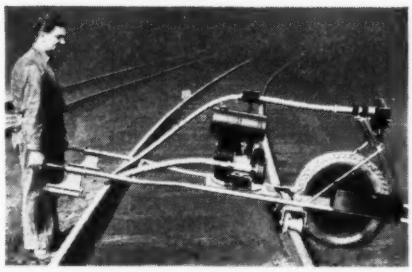
company for twenty-eight years, starting as mail clerk and serving as manager of the order and billing department, manager of the service department and assistant to the general sales manager. For the past three years he has been in charge of snap ring sales engineering and promotion.

The **Bethlehem Steel Company** has announced the following changes in its sales personnel: **J. M. Ellis,** formerly general manager of sales, and **M. C. Schrader,** formerly assistant to the general manager, have been appointed assistants to the vice-president: **K. L. Griffith,** formerly assistant general manager of sales, has been appointed general manager of sales; **D. C. Roscoe,** formerly manager of sales, sheets and strip, has been appointed assistant general manager of sales, and **A. T. Hunt,** formerly manager of sales, galvanized sheets and formed products, has been appointed manager of sales, sheets and strip.

C. L. Peirce, Jr., whose election as chairman of the board of **Hubbard & Co.,** Pittsburgh, Pa., was reported in the July issue, was born at Milwaukee, Wis., on January 4, 1873, received his education at St. Johns Military Academy, Delafield, Wis., and taught school for one year prior to entering the service of the Chicago Bell Telephone Company, where he served

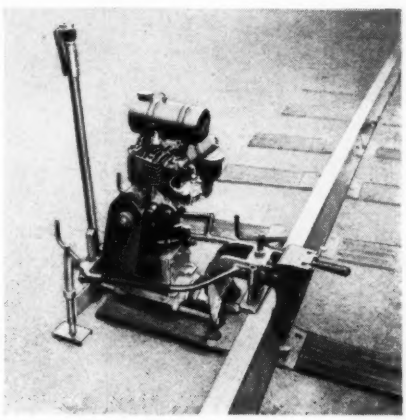
(*Continued on page* 800)

EASIER, FASTER TRACK WORK with these NEW RTW MODELS



Portable Flexible-shaft Grinder, Model P-40

You'll like this new easier-to-handle grinder for both on- and off-track work. Transporting wheel adjusts to three positions by new, foolproof spring locking device—machine clears switches and crossovers with ease, levels quickly for off-track use, gets on and off track faster. Power-unit mounted on ball bearing turn table facilitates handling flexible shaft and attachments. Six hp. air-cooled gasoline engine or electric motor drive.



Power Track Drill, Model P-34-A

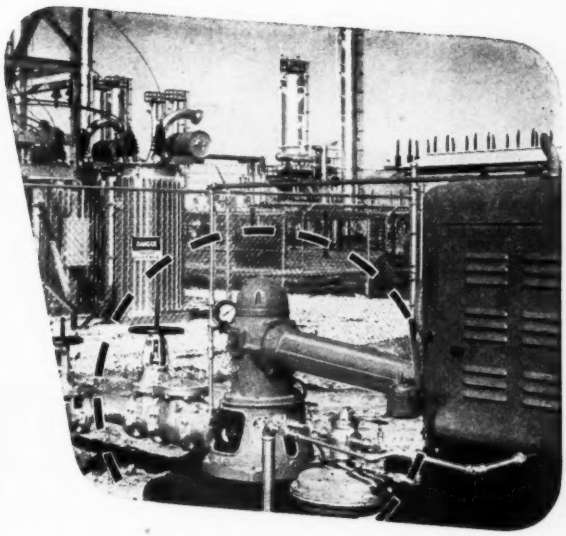
Superb balance, light weight . . . features you'll appreciate in this new track drill. Attached and removed from rail *fast*. Quick, accurate adjustment for leveling with rail and uneven ground; adjusts to various rail sizes. Lateral feeding of drill by ratchet gear and rack simplifies operation. Holes up to 1½" in less than a minute. Motor raises or lowers on frame. V-belts well guarded.

Get full details on these better, lighter, easier-to-work-with track machines. Bulletins on request.

Railway Trackwork Co.

3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

2080



WE ARE PROUD OF THIS PICTURE

To you, the reader, the above picture is just one of hundreds of Layne Well Water Systems that are now serving oil fields, refineries and pumping stations. But to us, it is a symbol of approval by one of the world's largest and most important industries. Furthermore, this picture serves to symbolize a record of nearly seventy years of successfully matching the highest quality materials with honest craftsmanship.

Yes, we are proud of this picture—and several thousand others of Layne Well Water Systems now serving Municipalities, Railroads, Factories, Chemical Works, Packing Plants, Paper Mills and Air Conditioning and Irrigation projects.

We know the penalty of leadership in our chosen field, the flattery of imitation and the real satisfaction of serving the same customers for generations and generations. Our equipment and services are consistently higher in quality than the buyer demands — more dependable than we promise—and longer lasting than the owner expects.

If such points of merit are of more interest to you than a "special price," we can serve you with complete satisfaction. For late bulletins, catalogs, etc., address

LAYNE & BOWLER, INC.

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- **pumps for wells, lakes, rivers, reservoirs, irrigation —or for any use where large quantities of water must be produced at low cost. Sizes range from 40 to 16,000 gallons per minute. Write for Layne Pump Catalog.**

LAYNE WELL WATER SYSTEMS

vertical turbine pumps

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc., Seattle, Washington * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minnesota, Minneapolis, Minnesota * International Water Supply Ltd., London, Ontario, Canada * Layne-Hispano Americana, S. A., Mexico, D. F.

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

These washers are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

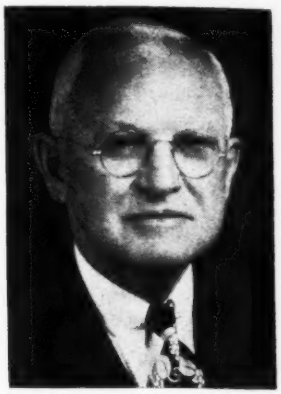
We control every step of their manufacture — from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

BEALL TOOL DIVISION *of Hubbard & Co.*
EAST ALTON, ILL.
Specialist Manufacturers of Spring Washers

BEALL Hi-Duty SPRING WASHERS
MADE ESPECIALLY FOR RAILROAD SERVICE

(*Continued from page* 798)

as cable man, switchboard installer, assistant to the superintendent of maintenance, and superintendent of shops. He was responsible for several inventions adopted by the telephone company, which lent him money to start a factory called



C. L. Peirce, Jr.

the Peirce Specialty Company. In 1909 he sold his company to Hubbard & Co., and became manager of the electrical materials department. Mr. Peirce was elected vice-president of Hubbard in 1926, and in 1929 he was elected president, the position he held at the time of his recent election as chairman of the board.

Effective July 1, the Chicago sales units of the **Carnegie-Illinois Steel Corporation** (a subsidiary of the United States Steel Corporation) were combined. The consolidated sales organization is directed by **G. A. Price,** manager of the Chicago district sales office. **E. W. Backes** has been appointed railroad industries sales mana-

G. A. Price

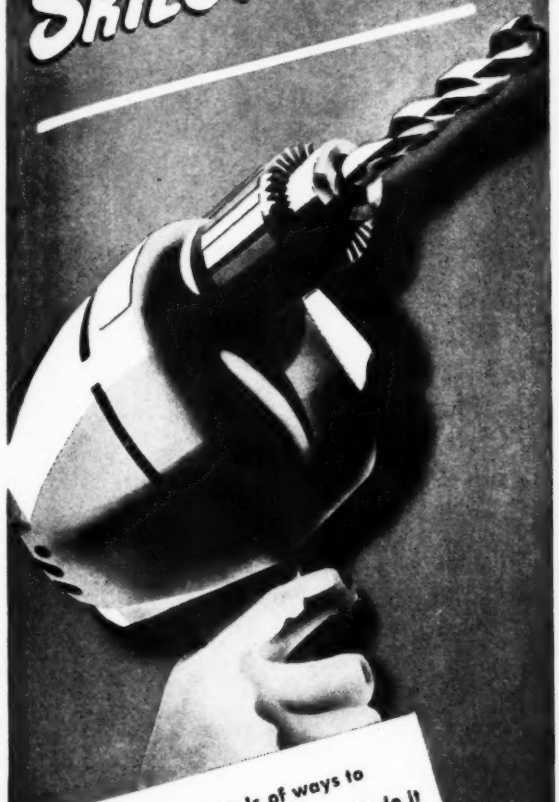
ger. **J. H. Morava** has been appointed manufacturing industries sales manager. **G. O. With** has been appointed construction industries sales manager.

Mr. Price was born in Chicago and received his higher education at Northwestern University. He entered the service of Carnegie-Illinois nearly 28 years ago, and has served in various sales capacities since 1920. In 1939 he was named head of the Chicago district sales organization.

(*Continued on page* 802)

DON'T JUST DRILL IT...

SKILDRILL IT!



There are all kinds of ways to drill a hole... but only one way to do it better, faster, easier... that's with a SKILDRILL. Ask your Distributor today about a demonstration.

SKILSAW, INC.
5033 Elston Ave., Chicago 30, Illinois
Factory Branches in Principal Cities

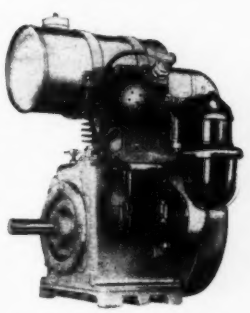
SKILTOOLS

The REAL MEASURE of ENGINE VALUE is "H. P. HOURS" of POWER SERVICE

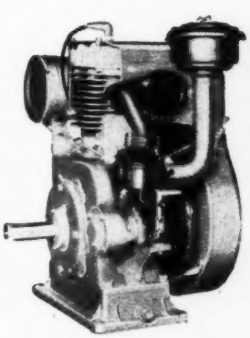
It isn't the original H.P. rating of an engine that counts but rather, the number of *H.P. Hours* of power service it will deliver during its lifetime. This, in the final analysis, is the real measure of *engine value.*

Wisconsin Air-Cooled Engines deliver the most H.P. Hours because they are designed and built for rugged, heavy-duty service. For example: every Wisconsin Engine, from the smallest to the largest, runs on Timken tapered roller bearings at both ends of the crankshaft to take up end-thrust and provide the best protection against bearing failure . . . at the same time assuring a smooth-running engine. This is just one typical detail that stands back of "Most H.P. Hours" of on-the-job power service.

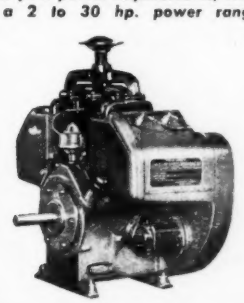
You can't go wrong if you specify "Wisconsin Air-Cooled Engines" to meet your power requirements, within a 2 to 30 hp. power range.



Models AB and AK, 4-cycle single cyl. engines, 2 to 4 hp.



Models AEH, AFH, AGH, AHH 4-cycle, single cyl., standard engines, 4 to 9 hp.



Model VE-4, V-type, 4-cyl. standard engine, 20 hp.

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN
WORLD'S LARGEST BUILDERS OF HEAVY-DUTY AIR-COOLED ENGINES

There's no need to rip up your old floor . . .

Stonhard Resurfacer makes repairs to wood or concrete floors easy. Your handy man can quickly install **Stonhard Resurfacer** at a thickness of only 1/2" right over the old, worn floor surface.

Floors resurfaced with **Stonhard** are warm, dry and resilient. Under traffic, **Stonhard** compacts and improves with each year of service.

SEND FOR FREE 48 PAGE BOOKLET

"Over the Rough Spots", a valuable informative guide to better building maintenance, yours for the asking . . . return the coupon.

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(*Continued from page* 800)

which will be replaced by the new consolidated sales organization under his direction.

The **National Aluminate Corporation,** Chicago, has announced the following appointments: **H. A. Marshall,** assistant to the vice-president, becomes assistant vice-president, with headquarters as before at New York. **J. L. Gibboney,** assistant to the vice-president, at Indianapolis, Ind., becomes assistant vice-president, with the same headquarters. **L. S. Heasom,** assistant manager, railway service, at Chicago, becomes assistant to the vice-president, with the same headquarters, succeeding **H. H. Richardson,** whose death at Chicago on July 5 is reported elsewhere in these columns. **R. G. Bielenberg,** railway service representative at Waverly, N.Y., becomes assistant manager, railway service, at Chicago, succeeding Mr. Heasom.

George Toth has joined the sales staff of the **R. H. Sheppard Company, Inc.** He was formerly district sales engineer for the Socony Vacuum Oil Company in North Carolina and South Carolina. Mr. Toth has been assigned to the Southern sales territory, where he succeeds **E. MacFarland,** who has been transferred to the eastern and New England area.

Obituary

H. H. Richardson, assistant vice-president of the National Aluminate Corporation, Chicago, died in that city on July 5.

Mr. Richardson was born at Savonburg, Kan., on July 23, 1898, attended the University of Kansas, and entered railroad service in 1918 as a chemist on the Missouri Pacific. In 1922 he became assistant water service engineer on the St. Louis Southwestern, and in 1923 he returned to the Missouri Pacific as engineer of water service. Mr. Richardson joined National Aluminate in 1928.

H. H. Richardson

E. C. Panton, heavy construction manager of the Bechtel Corporation, died suddenly June 20 at his home in Del Mesa, Cal. At the time of his death Mr. Panton was in charge of right-of-way maintenance for the Western Pacific and also in charge of construction of the Friant aqueduct of the Central Valley Water Project.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 741)

Power Shovel Dippers; Shovel and Dragline Parts—The American Manganese Steel Division of the American Brake Shoe Company has published a 40-page booklet which contains detailed descriptions of all Amsco dippers: among others the all-manganese steel welded type, the renewable lip type, and the Missabe type. Cross-sectional drawings and X-ray photographs highlight important design features. In addition to the dipper descriptions, the bulletin deals with the application of manganese steel parts to maintenance and breakdown problems. A section is devoted to a discussion of austenitic manganese steel—supported by charts, photomicrographs, and tables.

Installation of Timber Connectors—The Timber Engineering Company has issued a new booklet devoted to the application of Teco timber connectors to light and heavy timber structures. Prepared primarily for the use of builders and contractors, the booklet describes and illustrates the installation of split rings and shear plates for wide span roof trusses and other heavy structures, and the use of toothed rings for light built-in-place structures where power is not available. Constructional details are given for the use of clamping plates and spike grids on timber trestles. Included also is information concerning trussed rafters and framing anchors.

Floor Repairs and Maintenance—The Stonhard Company, Philadelphia, Pa., has announced a new folder describing Stonhard Stonfast, the company's material for making speedy repairs on rough, worn flooring surfaces. The folder illustrates and describes how Stonfast is applied to traffic lanes and other important working areas.

Link-Belt ¾-Yd. Shovel Crane—The Link-Belt Speeder Corporation has issued Catalog No. 2195—a word and picture story of the company's LS-Seventy shovel cranes. Containing many photographs and illustrations, the new catalog shows how the major features contribute to the construction, operation, and efficiency of the machine. Attention is called to a full range of interchangeable attachments available for conversion to shovel, crane, dragline, trench-hoe, or pile driver. Capacities, clearances, and working ranges are included.

Straight Blade Bulldozers—The Caterpillar Tractor Company has issued a 12-page booklet describing the three sizes of the company's straight blade, cable-controlled bulldozers—Nos. 8S, 7S, and 6S. The booklet emphasizes the structural and operational features of the bulldozer units which are designed for use with Caterpillar Diesel track-type tractors, Nos. D8, D7, and D6. Blade, tilting brace, and sheave construction are illustrated with cross-section views. Actual bulldozer applications and combinations of bulldozers with scrapers, rippers, winch and crane are outlined. Specifications are included.

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NEW OHIO ELECTRIC MAGNET CATALOG

New illustrated Catalog gives latest information on how Improved Ohio Lifting Magnets can solve your metal handling problems...faster... more efficiently...at lower costs.

Describes efficient performance of Ohio Magnets...lifting billets and ingots in steel mills... handling pig iron in foundries...rails and car wheels in railroad shops...loading and unloading cars and trucks in scrap yards.

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Send for your copy of the new catalog on Improved Ohio Lifting Magnets today.

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Chester Bland, Pres.
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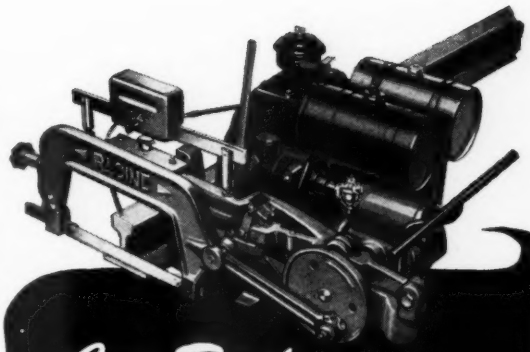


Cut Rail . . .
RIGHT ON THE TRACK
with . . .

RACINE PORTABLE Rail Saws

Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

Only one man needed to operate the Racine Rail Saw. Two men can easily carry it from rail to rail. These fast, accurate machines produce smooth, clean cuts without the overheating of rail ends that so often starts fractures leading to rail failure. Model 15 for rails to 7⅜" high; Model 16 for rails to 10" high.

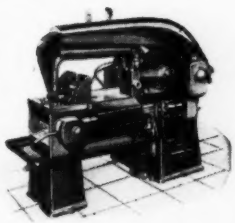
SIX COMMON JOBS FOR THIS MACHINE

1. Cutting and fitting rails at interlocking plants, crossings and switches.
2. Closing track in rail-laying operations.
3. Smooth, accurately cut rail for insulated joints.
4. Proper staggering of joints in curves.
5. Removing split, worn and battered rail ends.
6. Cutting out sections of wheel burned rails and fissures.

Models are available with gas engines, compressed air or electric motors. Write for complete catalog No. 58A. Address RACINE TOOL AND MACHINE CO., 1738 State St., Racine, Wisconsin.

RACINE HEAVY DUTY METAL SAWS FOR RAILROAD SHOPS

Cut axle shafts, boiler pipe, channels, angles and beams quickly and accurately. Models are available in all price ranges for either high speed production metal cutting or general all around shop work. Capacities 6" x 6" to 20" x 20". Ask for general catalog No. 12 giving description of complete Racine Saw line.



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RACINE
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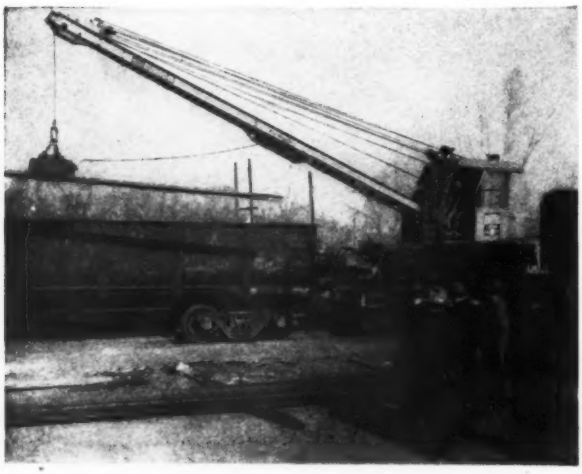
Track work is a Burro specialty because these cranes have everything it takes — speed, stamina, capacity and responsive control to the operator. Track gangs are more efficient when they work with a Burro because Burros were designed for railroad work—not adapted to it. Put a Burro to work in any one of the hundreds of maintenance-of-way jobs and see why it's saving time and costs for most of the country's railroads.

Only Burro cranes have:

- **Fast travel speeds—up to 22 M.P.H.**
- **Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).**
- **Elevated Boom Heels for working over high sided gondolas.**
- **Short tail swing — will not foul adjoining track.**
- **Low overall height — Burro can be loaded and worked on a standard flat car. (See below)**

EXHIBITOR
BRIDGE & BUILDING TRACK SUPPLY

Write for Bulletins



CULLEN-FRIESTEDT CO.,
1301 S. KILBOURN AVE. CHICAGO, ILLINOIS

with the **NEW** **Mall** REG U.S. PAT. OFF.

Rail Drill Attachment

POWERED BY MALL GASOLINE ENGINE *RAIL UNIT*

Here's a new Mall Attachment that converts your Mall Rail Grinder Power Unit into a fast and accurate Rail Drill. Every feature of this Mall Rail Drill is adapted to the drilling needs of the right-of-way. It has the power to put 1-1/16" holes through 100 or 112 pound rails in less than a minute . . . it is light in weight so that it can be carried from place to place . . . it is easily removed for passing trains . . . and it is short in length to allow convenient use on narrow switch sections. It can also be used for drilling "I" beams and girder rails.

The Mall Rail Drill is one of many attachments for track maintenance that operate from the Mall Rail Grinder—a 6 H.P. Gasoline Engine Power Unit with a wheel barrow mounting for on or off the track use.

EXHIBITOR
BRIDGE & BUILDING TRACK SUPPLY

Write for literature and prices.

Railroad Department

MALL TOOL COMPANY

7746 South Chicago Ave. Chicago 19, Illinois

MALL REPRESENTATIVES: Power Tools, Inc., St. Paul; Allied Tools & Supply Co., Louisville; George A. Secor, St. Louis; John N. Thorp Co., New York.

Mall REG U.S. PAT. OFF. PORTABLE POWER TOOLS

IS THIS THE BUCKET YOU NEED?

Blaw-Knox has made it quick and easy for railroaders to select the right bucket for the job in question and the crane capacity available. Whether it's for ash pit service, coaling, ballast handling, digging, or river-rail terminal work, *Bulletin 1989* will show you how well Blaw-Knox Buckets are adapted to these various requirements. Your request will bring a copy of Bulletin 1989 by return mail.

BLAW-KNOX DIVISION
of Blaw-Knox Company
2054 Farmers Bank Bldg., Pittsburgh 22, Pa.

BLAW-KNOX *CLAMSHELL* **BUCKETS**

SYNTRON
GASOLINE HAMMER

PAVING BREAKERS

100% SELF-CONTAINED

NO AIR COMPRESSOR OR HOSE
NO BATTERY BOX OR CABLE
NO SPRINGS

A ONE-MAN CREW THAT WILL SAVE MONEY FOR YOU

Busting concrete — **Digging** clay and shale
Cutting asphalt — **Tamping** backfill and a host of other jobs.

Write for illustrated folder

SYNTRON CO.

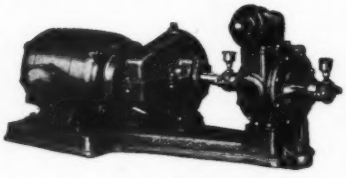
290 Lexington, Homer City, Pa.

for Handling **FUEL OIL, LUBE OIL** and Similar Liquids
Investigate

BLACKMER ROTARY PUMPS

SELF-ADJUSTING FOR WEAR

"Bucket Design" swinging vanes automatically compensate for wear. When the "buckets" finally wear out, a 20-minute replacement job restores the pump to normal capacity.



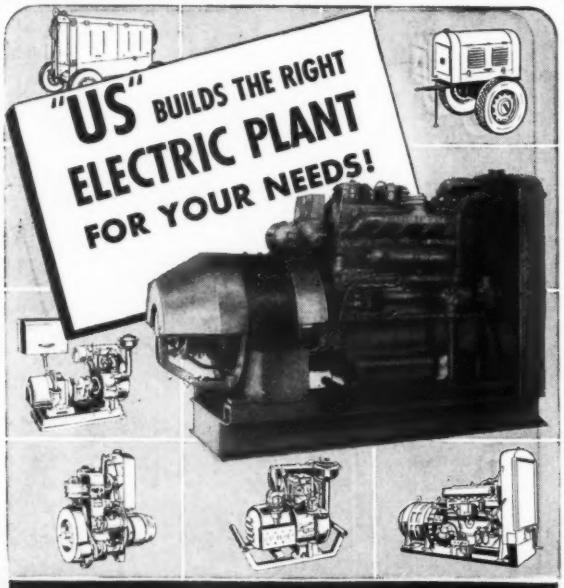
Write for Bulletin No. 307—Facts About Rotary Pumps

BLACKMER PUMP COMPANY

2140 Century Avenue Grand Rapids 9, Michigan

REFUELING UNITS FOR DIESEL LOCOMOTIVES

POWER PUMPS - HAND PUMPS
· EZY-KLEEN STRAINERS ·



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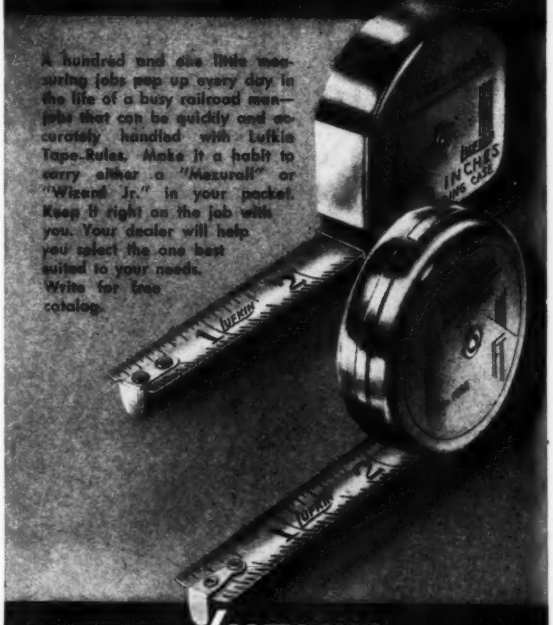
A hundred and one little measuring jobs pop up every day in the life of a busy railroad man—jobs that can be quickly and accurately handled with Lufkin Tape-Rules. Make it a habit to carry either a "Mezuroll" or "Wizard Jr." in your pocket. Keep it right on the job with you. Your dealer will help you select the one best suited to your needs. Write for free catalog.



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Remittance must accompany each order.

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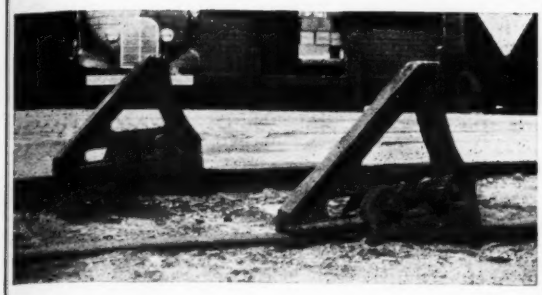
25-30 Cu. Yd. Capacity Standard Gauge Automatic Air DUMP CARS! Write Box 847A, Railway Engineering and Maintenance, 105 W. Adams St., Chicago 3, Ill.

"Hold Everything" at Stub Ends of Tracks with Q and C Car Stops



Q and C Car Stops are suitable for all sections of rail used in side tracks. Their use results in real economy because they are applied with a minimum of labor and require very little track space. They wedge firmly to the rails—no drilling is necessary.

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Order now for early delivery.

The Q and C Company

Chicago 5 New York 6 St. Louis 1

Simplex No. 550 Rail Puller and Expander; 25-tons capacity, 4½" to 8" expansion, 4½" to 8" pull, weight 87 lbs.

The proper tool to correct improper railjoints!

Without interrupting service, one man with a Rail Puller and Expander easily and quickly spaces joints, and prevents damage to rail ends, bolts and crossings. Also saves man-hours when lining crossings and switches, renewing insulated joints and end posts, and pushing or pulling continuous rail lengths.

Simplex LEVER - SCREW - HYDRAULIC **Jacks**

Templeton, Kenly & Co., Chicago (44), Ill.

Better, Safer Jacks Since 1899

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A NEW P&H ELECTRODE FOR *MACHINABLE* CAST IRON WELDS

Want cast iron welds that are *fully machinable*? Then try "Nicast"! Weld deposits of this new P&H Electrode can be drilled, tapped, milled or machined—in any manner, shape or form. "Nicast" simplifies cast iron welding—is easier, faster to use. It does away with elaborate preparations. Most applications require no preheating or postheating. Repair broken or worn castings with "Nicast"—weld cast iron to steel.

Look at These "NICAST" Features!

- Weld deposits fully machinable, strong and non-porous.
- For AC or DC.
- All position—flat, vertical, overhead, horizontal.
- Low amperage—welds will withstand hydrostatic pressure.
- Eliminates elaborate procedures, preparation.
- Available in 1/8" or 5/32" size—immediate delivery.

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All Sealtite products are offered in our thick, double-life, hot dipped galvanized finish. As the name implies, the service life of the bolt is lengthened saving replacement costs and assuring freedom from fastener corrosion. Actual experience tests prove the economy of using Double-Life Sealtite Products.

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New York Central roundhouse, Chicago. Over 400,000 board feet of Protexol-treated lumber in roof sheathing and purlins.

These interior and exterior views show the roof decking of a New York Central roundhouse at Chicago, which is being rebuilt. The lumber used is fire-retardant, impervious to decay and insects. It was pressure-treated with PROTEXOL, the wood preservative which has served railroads and industry for 50 years. PROTEXOL-treated decking, structural timbers, and sheathing is protected against attack from rot and termites as well as fire. Accepted by fire underwriters and many rail systems, PROTEXOL-treated wood is odorless, paintable, and non-corrosive to hardware. PROTEXOL services include design, pre-fabrication, treatment, and kiln-drying of material for all types of timber structures. These are available to railroads located anywhere in the United States.

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PROTEXOL has PROTECTED
Roundhouses - Locomotive Sheds
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and other structures against
FIRE, DECAY, AND INSECTS

PROTEXOL CORPORATION, Kenilworth 7, N. J.

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● POWER TRACK DRILLS

The Buda Power Track Drill, a tested, carefully engineered track tool embodies all the advantages that a track man requires. Light, fast and safe . . . a modern unit that provides faster, easier drilling of bolt holes in any weight rail. Adjustments are provided so that drill bit can be raised or lowered for accurate drilling. Overclutch hook may be instantly released without stopping or backing bit off rail. Drill is easily removed from track in less than ten seconds.

Write today for descriptive literature on Buda maintenance-of-way equipment

● RAIL BENDERS
Heavy stock and guard rail bends are easily made in the field by one man using a BUDA Rail Bender.

BUDA

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BUDA
Track Liners

BUDA
Track Jacks

PHANTOM VIEW SHOWING CONTACTS

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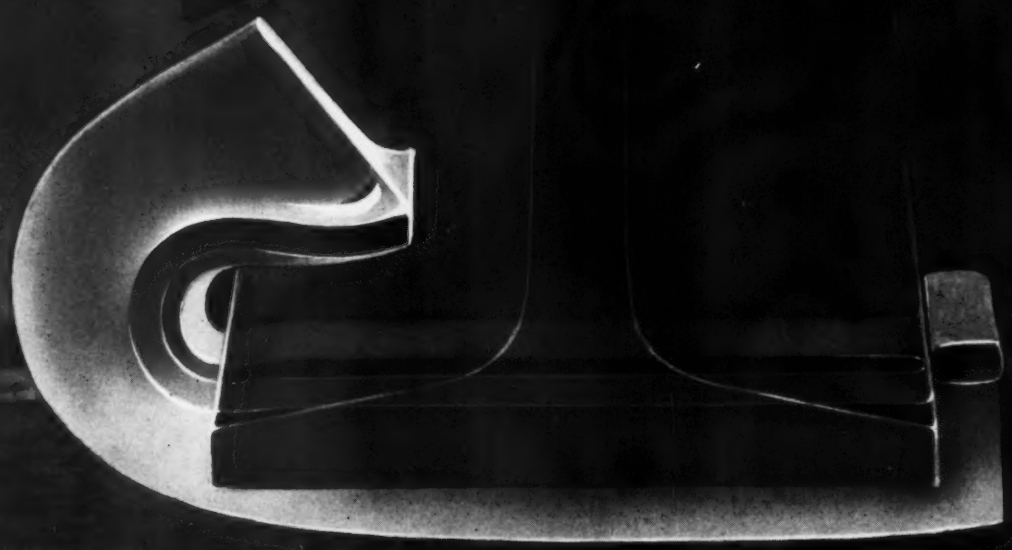

NOTE

- SECURE GRIP ON RAIL
- LOCK AT OPPOSITE END
- CONTACT UNDER RAIL BASE
- BEARING AGAINST TIE AND TIE PLATE.

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